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TM

November 1983

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Vol.1 No.5

THE PORTABLE COMPUTING MAGAZINE

FOR THE TRS-80 MODEL 100® ... FROM THE PUBLISHERS OF THE RAINBOW

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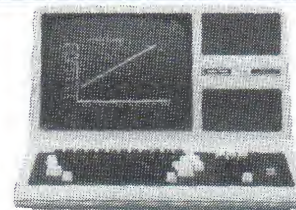
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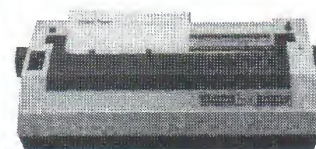
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Man 'Of Letters' Bullish On PoCo

I want to start off by saying thank you to the more than a hundred people who wrote me after last month's column. The response was somewhat greater than I thought it would be — but it wasn't all that surprising.

I especially appreciated all the kind words so many of you had to say about *PCM*. And, too, we thank you for taking the time to write when the words were *not* quite so kind. Yes, we revel in the good comments but we pay attention to be bad ones as well.

I'm also glad to be able to report that the number of comments in the latter category were few. What that seems to mean, at least to me, is that *PCM* is making some fine strides and that it is addressing needs that should be considered.

Oh, certainly, some of you wrote to say that you thought we had too many "leisure" activities in *PCM*; while others said that you thought (based on as an example LCD watches) that the Portable Computer would be very well suited for "arcade" games and couldn't we have more of them.

I suspect we'll be tangling with that issue for some time.

But most important of all, at least to me, is the fact that — in the last month or so — *PCM* seems to be attracting more and more articles and programs.

That's really good for us. And good for you, too. And, probably most important of all, that is what my column last month was really about.

We started up *PCM* with several people in the fold, so to speak, who would be able to write programs for us in the first issues. Our problem was that those people can only do so much: Both in terms of *what* they can write and in terms of their sheer creativity. The latter problem is more important than the former.

And the reason for that is because once someone has addressed the needs he or she has, it begins to become something of a strain to address the needs someone else might have as well. Really, it becomes difficult to *discover* the needs someone else might have.

Here's where you come in and here is why I am so encouraged by the increase in submissions to *PCM*. Because, as those submissions increase, we're tapping the needs of other people. Those needs may closely match your needs, or your interests.

Please do not let this mean to you that we're suddenly flush with programs and reviewers. But I see a change beginning to take place. As it does, I believe you will see *PCM* moving to better serve your own interests.

And, remember, we *do* very much encourage your contributions. And we pay for them, too.

I am negligent in not having welcomed Richard (Dick) White to the ranks of *PCM*'s contributing editors last month.

Dick will be offering a series called *BASIC Bytes* that will be of invaluable interest to those of you who want to learn to program in BASIC. Dick will also be contributing programs to these pages.

Dick's addition to the staff brings the first computer "name" to *PCM*. The author of several programs and a computer programmer with few peers, Dick has a knack for explaining the most complicated things in the most simple ways. I think you will be pleased with his column.

A couple of the letters I received expressed some concern about the future of the Portable Computer. The way some were talking about it, they felt the

Model 100 market has not grown as fast as they wished.

I can tell you that those fears are probably misplaced. Without revealing any sources, I think I can say that there will be continued support for the Portable Computer and that support will continue to grow in the weeks and months ahead.

As an example, I have seen and heard of some pretty spiffy programs that are moving toward the market — both from Radio Shack itself and from the third party market. And, while none of these (except, perhaps, the bar code readers) will have a singularly significant effect on the market, the sum total of them should make a very large impression. To steal a phrase, I'm bullish on the Portable Computer.

And, while on the subject, I do *not* think that the "salvation" of the market rests with big companies buying huge quantities of Portable Computers for their staffs to work with. Rather, I think the market is geared more toward the average businessperson who needs, yes needs, a computer with him in many different situations. Why, if every on-the-road salesperson bought a Portable Computer, Tandy's stock would go through the roof!

But what is even more significant is that those same people would be using the Portable Computer for other things as well — recreation, figuring their taxes, communication with other computers and the like. And, in doing so, they will create a huge market for software and other products, primarily because they will be looking for things to use for "their" computer.

So I'm bullish on the Portable Computer. And, if you're reading this, you most likely are, too.

And I don't blame you a bit.

—Lonnie Falk

Letters

ALL WORK, NO PLAY

Editor:

I must compliment you on *PCM* but I would like to say that you concentrate too much on business applications for the Model 100. The portability of the device has proven invaluable to an electrical engineering student such as myself.

Kelvin A. Desplanque
News Brunswick, Canada

LET'S GET SERIOUS

Editor:

I have now received three issues of *PCM* and would like to comment.

The general format and size is great. Please don't grow over 100 pages — it's just too much to read with all the other papers, etc., that directors, such as myself, must absorb each month. Even 50 pages is enough for me.

Some pages could be saved if the content is kept more serious. The last issue had 30 percent "waste" on frivolous games and light-hearted "nothings." Surely buyers of a \$1000 Portable don't need more than 5 percent (2 pages) of such relaxation!

However, there is a lot of good potential in *PCM* and I really like the approach from basics. Many users will be new to computers,

like myself (after six months on CoCo) and will need guiding hand-in-hand. I also like the big print and lively style. But please limit the game stuff to one per issue maximum!

Thanks and good luck.

M. Waters
Tracy, P.Q., Canada

Editor:

I am happy to see the introduction of your magazine and look forward to your future issues. I hope that you will be able to expand your reviews of software for business/professional applications as more programs become available.

It seems that Radio Shack sales personnel are thoroughly unfamiliar with other makes of equipment. Therefore, articles on interfacing the Model 100 with other makes of printers and direct communications with other microcomputers (such as the IBM-PC) would be most helpful.

Mark A Houser
Greenville, SC

BEST TO CHECK WITH CUSTOMS

Editor:

Regarding your article "Wonders of East and West," you run the risk therein of dangerously misleading your readers.

I travel overseas extensively on business. Most people are not aware that many countries prohibit anyone from bringing electronic equipment through their borders. Even those that are not so strict prohibit computers! Mexico, for example, requires a special permit for a computer to be brought in and I have seen them confiscated at customs. India prohibits the import of any electronic equipment, including even calculators and radios.

While tourists' baggage is not always searched, the prudent traveler should check the appropriate customs rules and then decide if the risk is worth taking.

Paul K. Biba
Bernardsville, NJ

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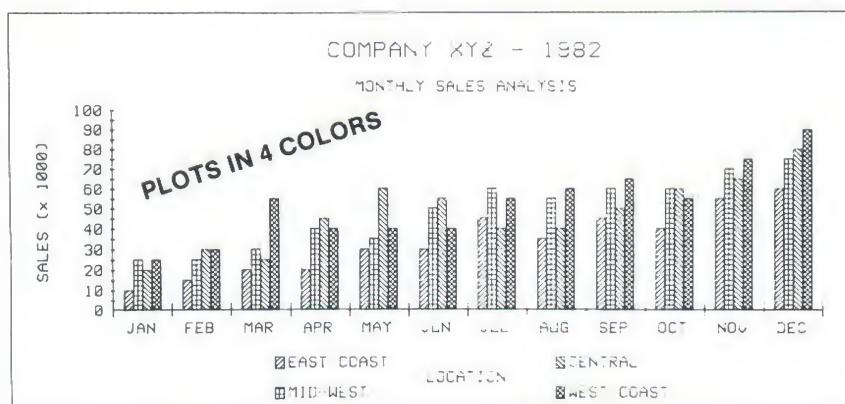
Editor:

AA batteries at 1.5V each are required by the TRS-80/100. Rechargeable batteries at 1.25V each will not work. At 8-days battery life with 32K, this is a shock. (Pardon the pun!)

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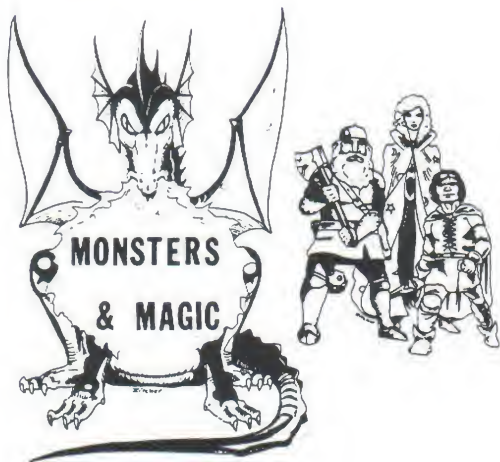
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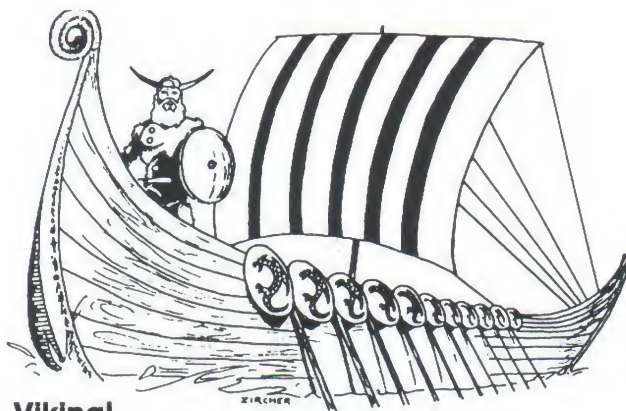
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Some 'Constants' About Variables

By Richard A. White
PCM Contributing Editor

In a high level language like BASIC, variables are provided to organize and reference the data being used in the program. A variable is simply a name given to a particular piece of data. Data should be thought of as being assigned to a variable and not as the variable equaling the data, even though the equal sign is used to make the assignment. Early BASICs emphasized the assignment idea by requiring the use of LET. One had to write LET X = 10 or LET Y\$ = "HELLO," LET is an optional statement in Model 100 BASIC. You may see LET used in older BASIC programming books.

In Model 100 BASIC you may use any one or two letter combination for a variable except reserved words. What is a reserved word? It is one that is also a BASIC statement or function command. ON, TO and GO are examples. When the computer encounters an ON, it starts looking for a variable representing a number to use in a following GOSUB or GOTO action. If your statement had been ON=20, no variable comes next, the computer gets confused and registers a complaint as a SN Error in XXX meaning a SYNTAX ERROR.

Actually, you may use whole words as variables, but only the first two letters are recognized. The objective is to allow writing clearer programs, but there are drawbacks that keep people from using the capability. First, there is the added memory used, one byte for each added letter each time the variable is used. Secondly, the number of conflicting reserved words (BASIC commands—remember?) become much more numerous. Lastly is the trouble in devising meaningful words which always are different from any other in the first two letters. If I had two FOR-TO-NEXT loops, one within the other, I might like to name the variable in the outer loop COUNTONE and the inner loop variable COUNTTWO. Since the first two letters are the same the computer cannot tell the difference and the loops won't work the way you expect. So, we will try ONECOUNT and TWO-COUNT instead. The first two letters are different, but ONECOUNT contains ON, a reserved word and SN Error results. Another loser is TWO-COUNT. The computer sees it as a subtraction, TW—CO without a variable to assign the result so, SN Error.

*Dick White has been programming in BASIC for over three years, and has a number of programs on the market for the Color Computer. He is also a columnist for **the Rainbow**, PCM's sister publication, and is a member of CINTUG, the Cincinnati TRS-80 Users' Group*

There are two basic types of variables, real and string. Real variables represent numbers, and are used directly in equations making calculations resulting in some number. Model 100 BASIC lets you define whether a variable will be an integer, a single-precision, floating-point decimal number, or a double-precision, floating-point decimal number. The higher the precision, the more memory necessary to store the number. Integer variables are useful for simple counting and other integer number operations which are encountered all the time. Aside from the memory savings, integer math is much faster than floating point math. This is easily demonstrated with the following program.

```
10 CLS:PRINT "START TIME "TIME$: FOR X%
=1 TO 5000 : NEXT
20 PRINT "END INTEGER TEST "TIME$
30 FOR X! = 1 TO 5000 : NEXT
40 PRINT "END SINGLE PRECISION TEST "TIME$
50 FOR X# = 1 TO 5000 : NEXT
60 PRINT "END DOUBLE PRECISION TEST "TIME$
100 END
```

When you run this program, you will see that the integer test takes three to four seconds, the single precision test takes 11 to 12 seconds and the double precision test takes 13 seconds.

Integer math is performed directly in the microprocessor registers. This results in speed, but limits the range of numbers allowed from -32768 to +32767. No decimals are allowed. You have to tell BASIC that you want the number to be an integer. The % after the X in Line 10 did this. Likewise, X! means X is single precision. Default is double precision. In Line 50, either X# = 1 or X = 1 produces a double precision operation. You can convert from one variable type to another. This is fairly well covered on page 114 in your Model 100 Manual.

Single and double precision number math is performed using a "floating point decimal" routine in ROM. The test times show that floating point math takes time to do. However, the time difference between single and double precision operations are not great. The big difference is the number of significant digits used and the memory space required to save the number. Single precision numbers consist of up to six significant figures plus a decimal point and use four bytes of memory compared to two for

an integer. Double precision numbers consist of as many as 14 significant figures and use eight bytes of memory. Both single and double precision numbers may range from $\pm 1\text{E}+62$ to $\pm 1\text{E}-64$. $\text{E}+62$ means 10 raised to the 62nd power.

You can use the type declaration tags %, !, # and \$ for a string variable throughout your program and have a clearly documented program, at least as far as variable types are concerned. You can also assign type attributes to variables based on the first letter of the variable at the beginning of the program. DEFINT I, K-N makes I, K, L, M, and N integers, as well, and two letter combinations starting with these letters,

such as LA, LX and IJ, would also be integers. However, type declaration tags take precedence over DEF commands. In the program above, we could have started Line 10 with DEFINT X : and used X rather than X% in the FOR-TO-NEXT loop. The result would have been the same. When the program reaches Line 30, X! will cancel the integer attribute and single precision operation will take place. Other definition commands are DEFSNG to assign the single precision attribute, DEFDBL for double precision and DEFSTR for strings. If you use the definition commands, be careful to keep a list handy of what you defined and check it as you use variables to avoid errors.

A string variable references a string of characters. The string may contain any character and may be up to 255 characters long. Of course, the "\$" following the variable defines it as a string. In the assignment statement for a string variable, characters must be between quotes, or defined using CHR\$(XX) or STR\$(Y). Here XX is the ASCII number for the character. Y is a real variable that is converted to a string having a leading space. Examples are A\$="THIS IS AN example", B\$= CHR\$(128) which is a telephone and N\$ = STR\$(20).

Strings can be added to each other in

a process called concatenation. C\$ = A\$ + " FOR THE ARTICLE ON VARIABLES." Now C\$ represents "THIS IS AN example FOR THE ARTICLE ON VARIABLES." If we concatenate C\$ with B\$ like this D\$ = C\$ + B\$ we would get the same string as before but with a telephone number after the period.

A\$ + " " is an allowable concatenation. A\$ appears on both side of the equality. We can also write A = A + 10. This comes back to the assignment idea. The right side is evaluated and the result is assigned to the variable on the left. The computer finishes its work on the right portion using whatever A or A\$ represent initially before it redefines them.

Both real and string variables can be viewed as either global or local. Actually BASIC variables are always global since they can be used anywhere in a BASIC program. In some languages, variables can be defined so they only have a value in a particular subroutine and are in fact local. Further, in these languages, the same variable name will mean one thing in the main program and another in a subroutine. We cannot define our variables like this, but we can view how we use them as local or global. In a file program, the variables that refer to the data records are global in that they are defined in the input section, changed in the editor, saved in another section to memory or tape, used in search and sort sections and in various subroutines. A variable used in a FORTONEXT loop in a subroutine means nothing when you exit that subroutine and may be reused elsewhere.

There is a savings of memory if certain variable names are prechosen and used only for local purposes. They can be redefined and used again and again in other parts of the program. This serves to help clarify the program if it is known that J and K, are always used locally, generally serve counting purposes, are defined as integers using DEFINT J, K and never have meaning once the using routine is left. This will work well with some careful discipline and I think is much better than trying to find an unused variable each time a short loop is needed. You should also define string variables and other real variables for local temporary data holding purposes. Just make sure all local variables are assigned data when they are first used in the routine and do not contain data needed elsewhere when the routine is exited.

A Bit Of Latitude

By Robert Frowenfeld
PCM Contributing Editor



This month *On The Road* is going to *traverse* some of the more traditional disciplines of computer applications and delve into something a little different. I've been given the *latitude*, if you'll pardon the expression, to develop a fascinating program that can be used by anyone interested in surveying. Whether you are a civil engineer or a landowner with a little surveying experience and a desire to survey your property, this program will do just about everything you could imagine! I first developed this program about 14 years ago while trying to learn surveying and computer programming at the University of Vermont. Although originally written in FORTRAN, I have successfully converted it to Microsoft BASIC, and, if I might add, it runs great.

The real beauty of having this program on a portable computer like the Model 100 is that you can examine the precision of your survey while you're still in the field — you don't have to wait until you get back to your desk to find out that you've made an error!

Before we get started, let's review some of the fundamentals of surveying so that we can use this program, called *TRAV.BA*, properly. I've named it *TRAV* because this program is designed to compute the error in closure of a traverse. A traverse is an area of land. It is usually marked off by placing stakes at the boundary points. These stakes can then be used in conjunction with a transit, a device for measuring the angle formed between two lines. Figure 1 is a drawing of a parcel of land we'll call PoCo Park of Prospect, Kentucky. As

you can see it has been staked off at 10 points labeled A, B, C, D, E, F, G, H, J and K. The lengths of the lines are indicated on the drawing and were determined by using a steel surveying tape. When performing a survey it is common practice to record the *bearing* of each line in the traverse. The bearing is the angle a line makes relative to the North or South. Bearings are counted from 0° to 90°, the 0° being either at the North or South point and the 90° either at the East or West point. For example, if a line makes an angle of 35° with North and is headed East, it has a *bearing* of N 35° E. For the purposes of this program we are going to have to use *azimuths*, or true bearings. These are (typically) measured from the South at 0° in a clockwise manner. Therefore, West would be 90°, North would be 180°, East would be 270°, and South (again) would be 0° or 360°. It is a simple matter to convert bearings to azimuths. In the south-west quadrant the azimuth and the bearing are the same. In the north-west quadrant the azimuth is 180° minus the bearing. In the north-east quadrant the azimuth is 180° plus the bearing. And finally, in the south-east quadrant the azimuth is 360° minus the bearing. It's really very simple. If you are doing a survey, just keep in mind that you want to record the azimuth of each line.

Now for the program. In order to properly run *TRAV.BA*, you must already have a data file set up. The name of the data file is *TRAV.DO*, that's easy to remember. Let's now discuss how this is going to work. First, you'll have to enter the *TEXT* program supplied on

your Model 100. When asked for the file to edit just enter the name *TRAV*. The first line to be entered is the traverse name. The second line is the number of points in the traverse; for this example there are 10 points in the PoCo Park traverse. Then for each line around the traverse enter the line length and the azimuth measured in degrees, minutes, and seconds, each separated by a comma. Figure 2 shows how the entries in a surveyor's field book might look for our PoCo Park example, and below this is a printout of the file *TRAV.DO* for this example.

That's it. All you have to do now is to get back into BASIC and run the program *TRAV.BA*. Before you run it, though, here's a helpful hint. I've already mentioned the convenience of having this program available to you when doing your field work, but there are routines built into *TRAV* to print out the results once you get back to the office. Line 20 initializes the variable "PR" to a value of zero. If you want all the printout to go to an attached printer, change this line to: 20 PR=-1.

The program will first display the traverse name (Figure 3). Next is a listing of the points as measured. The first point is considered the origin and its coordinates are 1000.00,1000.00. This is commonly done in surveying to avoid the occurrence of negative values if you go too far in the south or west directions. If you have the need to survey a large traverse and you wish to change these starting coordinates, simply change the values for X(1) and Y(1) in Line 60 of the program to the values you desire.

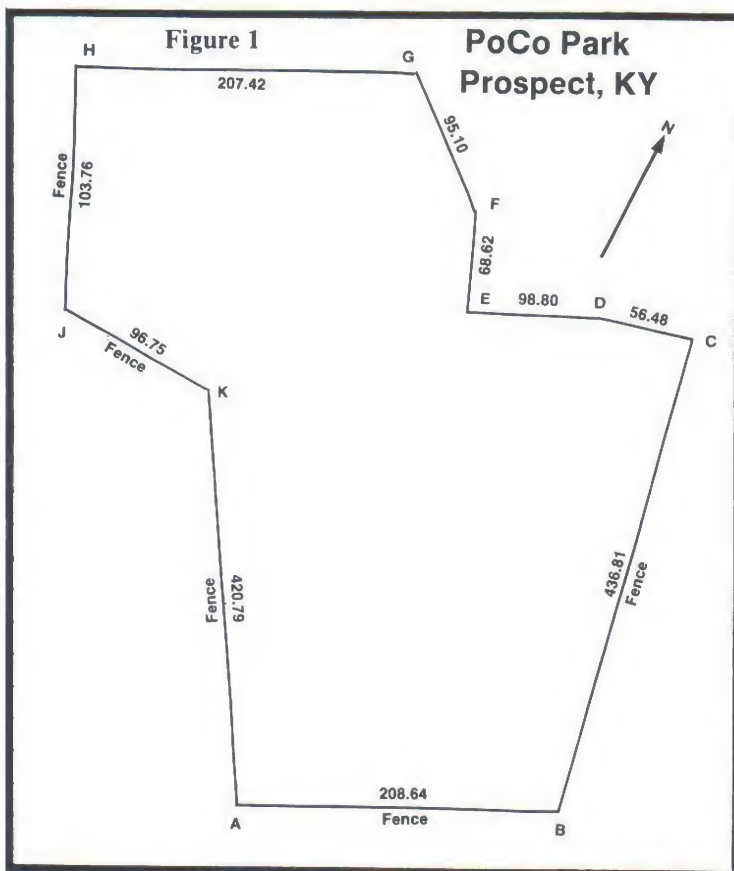


Figure 2

Surveyor's Field Notes		
Station	Distance (feet)	Azimuth
A	208.64	242° 31' 30"
B	436.79	154° 3' 30"
C	56.48	87° 1' 15"
D	98.80	53° 22' 0"
E	68.62	143° 22' 0"
F	95.10	120° 31' 0"
G	207.41	51° 40' 45"
H	103.75	321° 52' 45"
J	96.75	266° 52' 30"
K	420.77	320° 41' 30"

Listing of Input Data File TRAV.DO

```

PoCo Park
10
208.64,242,31,30
436.79,154,3,30
56.48,87,1,15
98.80,53,22,0
68.62,143,22,0
95.10,120,31,0
207.41,51,40,45
103.75,321,52,45
96.75,266,52,30
420.77,320,41,30

```

As mentioned above, each point's coordinates are displayed as they were determined by measuring tape and transit. The last point (point number 11 in our example) should have the same coordinates as the origin. However, due to a variety of inaccuracies that can occur when performing a survey, there is bound to be a small amount of error. In our example there was an error of 0.04 feet in *latitude*, or the North-South (Y) direction, and an error of 0.02 feet in *departure*, or the East-West (X) direction.

The next display generated by *TRAV* indicates the error in each direction, the total error in closure, and the error ratio. In the example, the error ratio was one part in 38,147. This is excellent and could be considered acceptable for

most applications of field surveying.

Now that the program has determined what the errors were in surveying, it will proceed to balance the traverse by distributing the errors proportionally over each line. Since the errors in latitude and departure were small, the lengths of only a couple of lines will have to be changed to close the traverse. Had the error been much larger we would expect a change to appear in all the lines. One nice thing about the Model 100 is the fact that it is doing all its computations to 14-digit accuracy. This is considerably more precise than using five-place or six-place logarithmic and trigonometric tables. It's also an assurance that your results will be accurate (no more looking up a table when

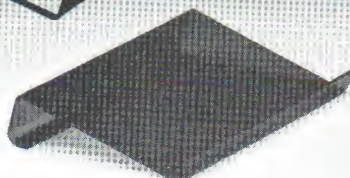
you should have looked down!).

After proportionally adjusting the line lengths, *TRAV* lists again the X-Y coordinates of all the points. Notice the small difference in the coordinates of some of the points as a result of the balancing procedure. More importantly, notice the coordinates for the last point, #11. They are now 1000.00, 1000.00, which is what they should be in a balanced traverse. The traverse has been closed!

The next screen shows the total area in square feet and acres as well as the perimeter of the traverse as it was measured. For those of you who are interested, this program uses the Double-Meridian-Distance method of computation — again with the 14-digit accuracy

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of your Model 100's math functions.

When using a transit, a surveyor usually can only measure angles to the nearest 10 seconds. Since I haven't done any surveying for some time, I'm not up to date on new equipment. I imagine that by now there are electronic transits that can measure to better than 10 seconds. Nonetheless, the next feature of *TRAV* is still useful. We've already balanced the line lengths to account for the errors in surveying, but what about

the angles? Well, since we know the correct line lengths, *TRAV* can compute the corrected azimuths. The next display shows the corrected azimuths in radians and degrees-minutes-second format accurate to .01°.

The last display shows the corrected line lengths, and we're done.

Here's a hint that will enable you to use *TRAV* for any size traverse. The program was originally set up to handle a traverse of 50 lines. While this would

satisfy most any surveying need, if you desire to modify the program, just change the DIM statement in Line 35.

P.S. We really don't know how many of you out there in PoCo land will use this program or have an interest in surveying, but we would sure appreciate your letting us know. If there is enough interest I would like to include a routine that would plot the traverse on the Model 100's LCD. Anybody out there interested?

Figure 3

PoCo Park

Measured Values for Coordinates

Point #	X-Coordinate	Y-Coordinate
1	1,000.00	1,000.00
2	814.89	903.74
3	1,005.97	510.96
4	1,062.37	513.90
5	1,141.66	572.85
6	1,182.60	517.79
7	1,264.53	469.49
8	1,427.25	598.10
9	1,363.20	679.72
10	1,266.60	674.45
11	1,000.04	1,000.02

Error Statistics

X Error : 0.04
Y Error : 0.02
Total Error: 0.05
Error Ratio: 1 / 38147

Balanced Values for Coordinates

Point #	X-Coordinate	Y-Coordinate
1	1,000.00	1,000.00
2	814.89	903.74
3	1,005.95	510.96
4	1,062.36	513.89
5	1,141.64	572.84
6	1,182.58	517.78
7	1,264.51	469.48
8	1,427.22	598.09
9	1,363.17	679.71

10 1,266.57 674.43
11 1,000.00 1,000.00

Area: 148,953.58 Sq. Ft.
3.42 Acres

Perimeter: 1793.11 Feet

Corrected Azimuth Angles

Line #	Radians	Deg	Min	Secs
1	4.233	242	31	30.38
2	2.689	154	3	35.39
3	1.519	87	1	16.88
4	0.931	53	21	58.76
5	2.502	143	22	5.25
6	2.103	120	31	4.36
7	0.902	51	40	43.60
8	5.618	321	52	39.75
9	4.658	266	52	28.12
10	5.597	320	41	24.78

Corrected Line Lengths

Line #	Length
1	208.65
2	436.79
3	56.48
4	98.80
5	68.62
6	95.10
7	207.40
8	103.75
9	96.75
10	420.77

The listing:

```

10 CLEAR 1000:DEFINT I-N
20 PR=0
35 DIM X(51),Y(51),AN(51),DI(51)
40 PI=3.1415926
50 DS=0
60 X(1)=1000:Y(1)=1000
70 F1$="####.##"
90 OPEN "TRAV.DO" FOR INPUT AS 1
100 LINE INPUT#1,TT$
110 INPUT#1,NP
120 FOR I=2 TO NP+1:INPUT#1,DI(I-1),AD,A

```

```

M,AS
130 D=DI(I-1)
140 A=(AD+AM/60+AS/3600)/57.2958
150 DX=D*SIN(A):DY=D*COS(A)
160 X(I)=X(I-1)+DX:Y(I)=Y(I-1)+DY
170 DS=DS+D
180 NEXT I
190 LA=I-1
195 XE=X(LA)-X(1):YE=Y(LA)-Y(1)
197 ER=SQR(XE*XE+YE*YE)
198 ET=DS/ER
200 CLS

```



```

210 PRINT TT$:PRINT:IF (PR) THEN LPRINTTT
$:LPRINT
220 A$="      Measured Values for Coordina
tes":PRINT A$:PRINT:IF (PR) THEN LPRINT A
$:LPRINT
230 GOSUB 800
240 GOSUB 900
245 XF=XE:IF ABS(XF)<.01 THEN XF=0
246 YF=YE:IF ABS(YF)<.01 THEN YF=0
250 CLS:PRINT TAB(12)"Error Statistics":
PRINT:PRINT TAB(10)"X Error      ":"USING F
1$;XF:IF (PR) THEN LPRINT TAB(12)"Error S
tatistics":LPRINT:LPRINT TAB(10)"X Error
      ":"USINGF1$;XF:
260 PRINTTAB(10)"Y Error      ":"USING F1$;
YF:IF (PR) THEN LPRINT TAB(10)"Y Error
      ":"USING F1$;YF
270 PRINT TAB(10)"Total Error:"USING F1$
;ER:IF (PR) THEN LPRINT TAB(10)"Total Er
ror:"USING F1$;ER
280 PRINT TAB(10)"Error Ratio: 1 /"INT(
ET):IF (PR) THEN LPRINT TAB(10)"Error Ra
tio: 1 /"INT(ET):LPRINT:LPRINT
300 GOSUB 900
310 PE=DS
320 UX=XE/PE:UY=YE/PE:T1=X(1):T2=X(2)
330 LI=NP+1
340 FOR I=2 TO LI
350 DE=T2-T1:CD=DE-DI(I-1)*UX:X(I)=X(I-1
)+CD:T1=T2:T2=X(I+1)
360 NEXT I
370 T1=Y(1):T2=Y(2)
375 FOR I=2 TO LI
380 LA#=T2-T1:CL=LA#-DI(I-1)*UY:Y(I)=Y(I
-1)+CL:T1=T2:T2=Y(I+1)
390 NEXT I
400 'print balanced values
410 CLS:A$="      Balanced Values for Coor
dinates":PRINTA$:PRINT:IF (PR) THEN LPRI
NT A$:LPRINT
420 GOSUB 800:GOSUB 900
430 SA=Y(1)*(X(2)-X(NP))+Y(NP)*(X(1)-X(N
P-1))
440 FOR I=2 TO NP-1
450 SA=SA+Y(I)*(X(I+1)-X(I-1))
452 NEXT I
455 AR=ABS(SA/2)
460 AC=AR/43560
470 CLS
480 PRINT@90,"Area: "USING"#,"+F1$;AR;:P
RINT" Sq. Ft.":IF (PR) THEN LPRINT TAB(
10)"Area: "USING"#,"+F1$;AR;:LPRINT" Sq
. Ft."
490 PRINT@138,USING F1$;AC;:PRINT" Acre
s":IF (PR) THEN LPRINT TAB(18) USING F1$
;AC;:LPRINT" Acres"
495 PRINT@205,"Perimeter: "USING F1$;D
S;:PRINT" Feet":IF (PR) THEN LPRINT TAB
(5)"Perimeter: "USING F1$;DS;:LPRINT"
Feet":LPRINT:LPRINT

```

```

497 GOSUB 900
500 'compute corrected angles
502 X(NP+1)=X(1):Y(NP+1)=Y(1)
505 FOR I=1 TO NP
506 DX=X(I+1)-X(I):DY=Y(I+1)-Y(I)
507 DI(I)=SQR(DX*DX+DY*DY)
508 IF DX<0 THEN 570 ELSE IF DX>0 THEN 5
40
510 IF DY<0 THEN 512
511 AZ=0:GOTO 599
512 AZ=PI:GOTO 599
540 IF DY<0 THEN 546 ELSE IF DY=0 THEN 5
44
542 AZ=ATN(DX/DY):GOTO 599
544 AZ=PI/2:GOTO 599
546 DY=ABS(DY):AZ=PI-ATN(DX/DY):GOTO 599
570 IF DY=0 THEN 574 ELSE IF DY>0 THEN 5
76
572 AZ=PI+ATN(DX/DY):GOTO 599
574 AZ=3*PI/2:GOTO 599
576 DX=ABS(DX):AZ=2*PI-ATN(DX/DY)
599 AN(I)=AZ:NEXT I
600 'print azimuths
610 CLS:A$="      Corrected Azimuth Angl
es":PRINT A$:PRINT:IF (PR) THEN LPRINT A
$:LPRINT
620 A$="Line #      Radians      Deg Min
Secs":PRINT A$:IF (PR) THEN LPRINT A$
630 FOR I=1 TO NP
640 DE=AN(I)*57.2958:ND=DE:MI=(DE-ND)*60
650 SE=(DE-ND-(MI/60))*3600
660 A$=" ##      #.###      ### ###
###.##":PRINT USING A$;I;AN(I);ND;MI;SE:
IF (PR) THEN LPRINT USING A$;I;AN(I);ND;
MI;SE
670 NEXT I:GOSUB 900
700 'print corrected line lengths
710 CLS:A$="      Corrected Line Length
s":PRINT A$:PRINT:IF (PR) THEN LPRINT A$
:LPRINT
720 PRINT TAB(10)"Line #      Length":IF
(PR) THEN LPRINT TAB(10)"Line #      Le
ngth"
730 FOR I=1 TO NP:A$=" ##      #.###.##
":PRINTTAB(10) USING A$;I;DI(I):IF (PR)
THEN LPRINT TAB(10) USING A$;I;DI(I)
735 NEXT I
740 PRINT:GOSUB 900:CLS:END
800 '
810 A$="Point #      X-Coordinate      Y-Coord
inate":PRINT A$:IF (PR) THEN LPRINT A$
820 A$=" ##      #.###.##      #.###
.##":FOR I=1 TO NP+1:PRINT USING A$;I;X(
I);Y(I):IF (PR) THEN LPRINT USING A$;I;X
(I);Y(I)
825 NEXT I
830 RETURN
900 PRINT@280,"      Press any key to conti
nue ... ":IF (PR) THEN LPRINT:LPRINT
905 A$=INPUT$(1):RETURN

```


Organize Your ADRS.DO Files

With This 'Label Maker'

By Dale Wheeler

To say that I am in love with my Model 100 would be a gross understatement. The total portability coupled with the built in software form a combination that make the machine hard to resist.

The *ADDRSS* file was the first application put to use, and after extensive use only one shortcoming has surfaced. When the *ADRS.DO* file is listed on a printer, all of the individual fields are pushed together making it very difficult to read.

Here are two versions of a utility that can be used to print your *ADRS.DO* files in a more organized and readable format. When complete, the printout resembles a batch of two-across labels. One version is for use with a parallel printer, while the other is used with a serial printer via the RS-232 port.

Serial Printers

To use the serial version you will have to make up a printer cable as described

in the September issue of PCM, Page 21.

The serial version of the program is set up for a 2400 Baud printer and 8-bit words, and includes a delay loop that allows the printer to catch up with the computer after each line is printed. This delay can be adjusted to your printer by changing the value in the FOR-NEXT loops in lines 46 and 48 of the program. To change the Baud rate or any other communications parameter, refer to pages 35 or 85 of the M100 manual.

Parallel Printers

No hardware modifications are necessary on the parallel version. All of the following applies to both serial and parallel versions.

Setting Up

Before either program will work, your *ADRS.DO* file will have to be set up with "field separators." That is, the individual parts of each record will have

to be separated with a character that the program can recognize as a delimiter. I have chosen to use the asterisk (*) for a separator because it is not used anywhere else in the file. You should also use four fields in each record, they are: 1) Name, 2) Address, 3) City, St. Zip and 4) Phone number, with the field separator inserted between each. For example, to create a new *ADRS.DO* file with this format, enter the *TEXT* program and type in the following:

John Doe*

Notice the asterisk immediately following the "e" in Doe. This is the first field separator. Follow this with the address: 1234 Nonesuch Road*

Again notice the asterisk after the word Road. Now enter the City, State and Zip code

Trent, TX 79999*

Don't forget the asterisk, and finish up with the phone number, with a colon at the beginning and end:
:123-4567:*

Don't forget to enter the final asterisk and press the ENTER key two times. This will mark the end of this particular entry and insert a blank line between it and the next entry. Use the same procedure to enter the remainder of your address file. An *ADRS.DO* file with

John Doe
1234 Nonesuch Road
Trent, TX 79999
:123-4567:

Joe Blow
771 Backroad St.
Tye, TX 79888
:111-3215:

Name 3
Address 3
City, State Zip
:Phone:

Name 4
Address 4
City, State Zip 4
:Phone:

(Dale Wheeler, an electronics technician for Hendrick Medical Center in Abilene, Texas, has been "into computers for about four years, starting with the TRS-80 Color Computer." He is also a ham operator with an extra class license. His call number is AG5W.)

four entries should look like the following:

```
John Doe*1234 Nonesuch Road*Trent,TX
79999*:123-4567:*
```

```
Joe Blow*771 Backroad St.*Tye,TX 79888*
:111-3215:*
```

```
Name 3*Address 3*City, State Zip*:Phone:
*
```

```
Name 4*Address 4*City, State Zip 4*
:Phone:*
```

Notice the field separators (*) between the fields and the blank line between each record.

Running

When the program is run, the first prompt will be "Hard copy (Y/N)." If you answer N (no) the ADRS.DO file will be printed only on the screen, two records at a time for your inspection. To advance to the next two records, press ENTER. If you answer Y (yes) then you will be prompted with "How many copies?" Input the number of copies you need and press ENTER. The entire file will then go to the lineprinter.

Listing 1 (Serial):

```
2 'LABELS-SERIAL
4 MAXFILES=1: CLEAR4500:DIMA$(100)
6 OPEN"RAM:ADRS.DO"FOR INPUT AS 1
8 N=N+1: IF EOF(1) THEN 12 ELSE LINE INPUT #1, A$(N): IF EOF(1) THEN 12 ELSE INPUT #1, X$
10 GOT08
12 CLOSE: OPEN"COM:68E2E"FOR OUTPUT AS 1:
'2400 baud 8 bit words to serial port
14 CLS: PRINT"Hard copy (Y/N)": HC$=INPUT$(1): IF HC$="" OR HC$="n" THEN HC$="N" ELSE IF HC$="y" THEN HC$="Y"
16 IF HC$="Y" THEN PRINT: INPUT"How many copies": NC: FOR CN=1 TO NC: CLS: PRINT"Copy #": CN: GOSUB 18: GOT020 ELSE 20
18 FOR BS=1 TO 5: PRINT #1, CHR$(13): GOSUB 48: NEXT BS: CL=5: RETURN
20 FOR X=1 TO STEP 2: Y=X+1
22 A$=A$(X): CLS: PRINT A$: IF A$="" THEN A$="*****"
24 B$=A$(Y): PRINT: PRINT B$: IF B$="" THEN B$="*****"
26 IF HC$="N" THEN 34
28 FOR Z=1 TO 4: C=INSTR(A$, "*"): C$(Z)=LEFT$(A$, C-1): A$=RIGHT$(A$, LEN(A$)-C): NEXT Z
30 FOR Z=1 TO 4: C=INSTR(B$, "*"): D$(Z)=LEFT$(B$, C-1): B$=RIGHT$(B$, LEN(B$)-C): NEXT Z
32 FOR Z=1 TO 4: E$=C$(Z)+SPACE$(40-LEN(C$(Z)))+D$(Z): PRINT #1, E$: CHR$(13): GOSUB 46: CL=CL+1: NEXT Z: PRINT #1, CHR$(13): GOSUB 48: CL=CL+2: IF CL=>5 THEN GOSUB 38: GOSUB 18: GOT036 ELSE 36
34 PRINT@240, "": INPUT"Press <ENTER> to continue": WAIT$
36 NEXT X: IF HC$="N" THEN 44 ELSE GOSUB 38: GOT040
38 FOR LC=CL TO 65: PRINT #1, CHR$(13): GOSUB 48: NEXT LC: CL=0: RETURN
40 IF HC$="N" THEN 44
42 NEXT CN
44 CLOSE: CLS: END
46 BEEP: PRINT@280, CHR$(27): "p": Wait "": CHR$(27): "q": FOR DL=1 TO 800: NEXT DL: RETURN
```

N

```
48 BEEP: PRINT@280, " Wait "": FOR DL=1 TO 100: NEXT DL: RETURN
```

Listing 2 (Parallel):

```
2 'LABELS-PARALLEL
4 MAXFILES=1: CLEAR4500:DIMA$(100)
6 OPEN"RAM:ADRS.DO"FOR INPUT AS 1
8 N=N+1: IF EOF(1) THEN 12 ELSE LINE INPUT #1, A$(N): IF EOF(1) THEN 12 ELSE INPUT #1, X$
10 GOT08
12 CLOSE
14 CLS: PRINT"Hard copy (Y/N)": HC$=INPUT$(1): IF HC$="" OR HC$="n" THEN HC$="N" ELSE IF HC$="y" THEN HC$="Y"
16 IF HC$="Y" THEN PRINT: INPUT"How many copies": NC: FOR CN=1 TO NC: CLS: PRINT"Copy #": CN: GOSUB 18: GOT020 ELSE 20
18 FOR BS=1 TO 5: LPRINT CHR$(13): NEXT BS: CL=5: RETURN
20 FOR X=1 TO STEP 2: Y=X+1
22 A$=A$(X): CLS: PRINT A$: IF A$="" THEN A$="*****"
24 B$=A$(Y): PRINT: PRINT B$: IF B$="" THEN B$="*****"
26 IF HC$="N" THEN 34
28 FOR Z=1 TO 4: C=INSTR(A$, "*"): C$(Z)=LEFT$(A$, C-1): A$=RIGHT$(A$, LEN(A$)-C): NEXT Z
30 FOR Z=1 TO 4: C=INSTR(B$, "*"): D$(Z)=LEFT$(B$, C-1): B$=RIGHT$(B$, LEN(B$)-C): NEXT Z
32 FOR Z=1 TO 4: E$=C$(Z)+SPACE$(40-LEN(C$(Z)))+D$(Z): LPRINT E$: CHR$(13): CL=CL+1: NEXT Z: LPRINT CHR$(13): CHR$(13): CL=CL+2: IF CL=>5 THEN GOSUB 18: GOT036 ELSE 36
34 PRINT@240, "": INPUT"Press <ENTER> to continue": WAIT$
36 NEXT X: IF HC$="N" THEN 44 ELSE GOSUB 38: GOT040
38 FOR LC=CL TO 65: LPRINT CHR$(13): NEXT LC: CL=0: RETURN
40 IF HC$="N" THEN 44
42 NEXT CN
44 CLOSE: CLS: END
```

PCM

ARE PORTABLES SAFE FOR FLYING?



Five major airlines have doubts, and have ordered them grounded while a Federal commission investigates.

By Jim Hawk

Here's the bad news: Fearing disruption of critical navigation systems on jetliners, five carriers — American, United, Eastern, Continental, and Western airlines — have quietly acted to prohibit passengers from using their portable computers while in the air. The good news: the ban is mainly out of fear of the unknown, not confirmed disruptions of aviation electronics, or "Avionics."

Every new advance in technology brings with it a whole new set of safety questions, and the portable computer is no exception. Even five years ago, who would have thought that a 64K machine would be carried like a notebook and run on penlight batteries, much less that it would be used on a plane? Now, the federal government has set up an advisory panel on portable computers in aircraft. The issue of portable compu-

ters on airlines has become a topic of intense interest in Washington, possibly more so due to current events. Namely, the KAL flight 007 that strayed off course and over a secret Soviet missile base, apparently because the pilot misentered navigational figures into the onboard computers of his American-built Boeing 747. We'll never know for sure, but what if there might have been contributing factors — like radio interference caused by a portable computer? One thing is known for sure — at least five major airlines have banned the use of personal computers while in-flight. The following is a special report on the Model 100 and its demonstrable radio interference.

A Do-it-yourself Test

First of all, there can be no debate that the PoCo has some bizzare effects on consumer electronics located nearby. Most of the time the effects are mild . . . I've learned to ignore the "herring-bone" pattern I get on channels 4 and 5 of the Washington area on my 9-inch color TV, which sits in my office about two feet from the PoCo's usual spot.

You can do your own un-scientific test to literally *hear* what I mean. Find any portable AM-FM radio and de-tune it slightly off-channel in the FM range of 88 to 94 MHz, and turn on the Model 100. Hold the radio about six inches away from PoCo, and rotate it for best effect. With the 100 just turned ON with the menu displayed, I heard through my walkman-type headphones what sounded exactly like a lawn mower idling! Now, try going to a text file and move the cursor downward so the file starts scrolling. During each "blink" when the 100 is moving all the text lines up one column, there's the multi-toned radio burst of your Model 100, electronically "thinking." Then, run a BASIC program, and listen to the variety of tones. Or, go to the *ADDRSS* file and listen as the 100 finds a name . . . each function seems to have its own unique tone signature.

I've found that just about any radio picks up the M100's "signals" at close range, and it's also audible over TV audio channels in the low-VHF range — especially with peripherals like a cassette or A.C. supply plugged in. This

(Jim Hawk has been working in radio news for the past 12 years, and has a science and electronics background. He also does freelance writing in Washington, D.C.)

is to be expected, since all the connecting wires help transmit. All right, but other household components produce interference — just try listening to an AM radio nearby your TV. Or, watch your FM signal wash in and out when a jetliner passes close by. But these effects are minor, and have no measured safety hazards. When it comes to possible hazards to an airliner, though, a whole host of federal agencies and commissions come into play.

What the Government Says

Before being offered for sale, the Model 100 had to meet the FCC standards on radio interference. Will McGibbon, division chief of the Federal Communication Commission's test facility in suburban Washington, confirmed that his lab tested the 100, and gave it a clean bill of health on meeting the rules for radio interference. But he also said that, just as for other computers, his technicians were measuring "spikes" around 2.4 MHz with many harmonics up and down the frequency scale. He said some were 10-12 times higher than other types of TV interference, but that standards for the home are generally more permissive than in other applications, especially those en-

gaging flight regulations. For example — to this day, any radio or TV is banned from in-flight use on airlines.

What The Airlines Say

Only United Airlines has actually claimed any problem with on-board use of portable computers. But that one incident—true or not—has sparked the controversy. Joe Hopkins, a United spokesman, told *The Wall Street Journal* that a portable computer "seemed to" cause a faulty reading on a plane's navigational electronics.

The airlines worry that the admittedly low-level radio frequencies emitted by portable computers might be picked up by one of a jetliner's several antennas mounted under the belly of the plane.

Some people wonder whether a passenger typing on a portable computer might somehow alter the data flow in the plane's navigational computers or cause enough interference to disrupt air-to-ground communications. The problem right now is that no one has done a definitive study... especially with the possibility of multiple portables being used on the same plane. Would this "electronic cacophony" of so-called

spikes somehow echo into aircraft avionics? The government wants to find out, with a special committee being set up by a federal advisory commission to the Federal Aviation Administration. The executive board of the Radio Technical Commission for Aeronautics voted on September 23 to look into the matter. The commission's director of technical services, Bill Fuchs, says Radio Shack/-Tandy sent him a copy of a Tandy-financed Ford Aerospace report on the Model 100's interference. "According to them, they have a clean bill of health as far as the aircraft application" is concerned, he said.

Tandy's Response

The 40-page Ford Aerospace report was unavailable at press time, but Tandy's engineering liaison with the FCC, Dave Garner, told me "the only thing it says is that it meets the (FAA) standard 160-A of the environmental conditions and test procedures for airborne equipment"... (beyond complying with part 15 and 68 of FCC regulations). It's a very hazy area because the FAA doesn't spell it out, and the guidelines are 20 years old. For the record, FAA regulations currently prohibit any portable electronic device on an aircraft except

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hearing aids, tape recorders, heart pacemakers, electric razors, and other devices that airlines decide to permit—a very big loophole. Further, said Garner, “they (Ford Aerospace) concluded that it met the standard . . . now, whether there’s any avionics problem or not, we have no statement to that effect.” Reflecting the company’s confidence, Tandy still had TV ads in late September showing an airline passenger with a Model 100. And, airlines like Pan Am, TWA, and Republic still permit portable computers. Radio Shack’s executive vice president for marketing, Bernie Appel, says his company will stay out of the fray, leaving the decision to the individual airline companies. But, he does maintain that Radio Shack did extensive testing on the 100 and didn’t find *any* indication that the computer can pose a danger to air travel.

Let’s “look into” the Matter

If you end up adding 8K RAM memory chips (who doesn’t), ask the Radio Shack technician if you can watch. I did, and it was well worth it. The neatly laid-out main circuit board is a beautiful thing to behold, packed with ROM, RAM and the all-important Central Processing Unit, or CPU. This

battery-sparing chip operates with a “clock speed” of 2.4 MHz—in other words, it’ll make 2,400,000 decisions, if you will, in a matter of one second. All this on-off switching is happening so fast, that electromagnetic waves are created . . . and that’s the crux of the issue. The navigational and auto-pilot computers that are on board a 747, for example, must create similar electro-

“The airlines worry that the admittedly low-level radio frequencies emitted . . . might be picked up by one of a jetliner’s several antennas . . .”

magnetic disturbances. And, a look at these miniature marvels of avionics reveals extensive use of metal housings and hard steel shells to protect against interference (and make them extremely durable). A look into the Model 100 reveals no such metal housing around the CPU. One precaution was taken, however: a metal-foil-backed, soft-

foam-rubber-insulated adhesive tape has been installed underneath the main circuit board. That’s more than enough to meet the current government standards. Does Tandy intend to make any design changes, such as a metal box around the CPU? No, says engineering liason Dave Garner, “we don’t see any need for that right now.” On setting up a commission to study the potential problem, Garner agrees “that sounds like a good idea . . . they ought to nail it down.”

In conclusion, all computers now being sold, portable or not, meet the government’s current standards for radio interference. But no one ever foresaw personal portable computers being taken on board airliners—especially since those standards were drawn up 20 years ago. We need updated information, and maybe tougher standards, so that portable, battery-operated computers can be used routinely by anyone, anywhere. Hopefully, the airlines’ fears will be put to rest . . . just like they were with portable calculators. Or, if it takes a product modification by the manufacturers, so be it. But it’s clear that with the incredible popularity of portable computing, reliable answers must be found.

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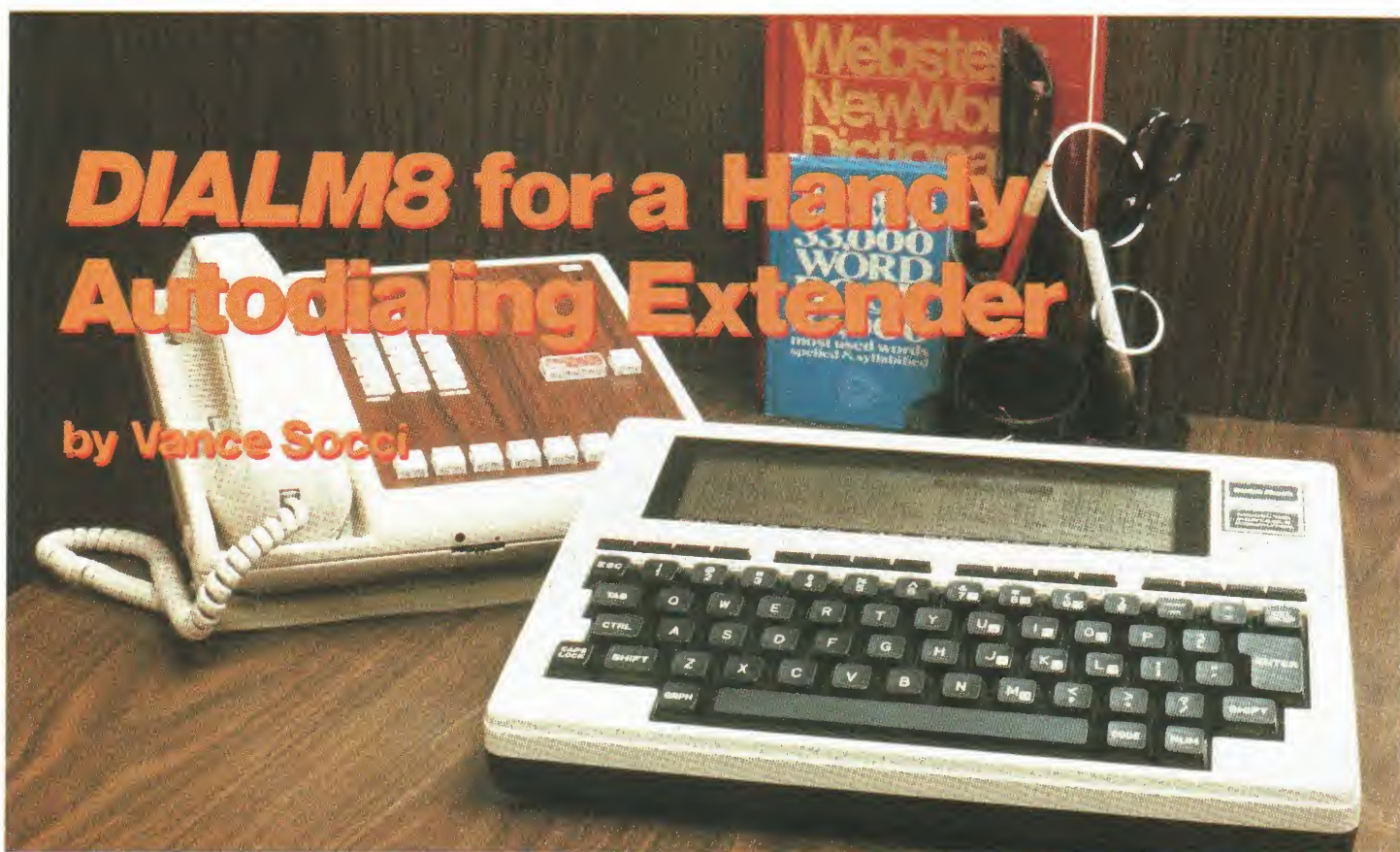
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DIALM8 for a Handy Autodialing Extender

by Vance Socci



Have you ever selected a phone number in your ADRS.DO file with the "Find" command in *TELCOM*, only to have to use the "Call" command to enter the number again because the area code in the number was the same as the one you are dialing from? Is "Find" in *TELCOM* useless to you at work because you have to dial a prefix (such as 9) to get an outside line? Have you ever wished you could automatically re-dial a number you selected in *TELCOM*, or keep calling the number until it stopped being busy?

Dialm8 provides a solution for these situations by adding powerful capabilities to the Model 100's already impressive auto-dialing capability. It will run on any Model 100, and has a similar feel and command structure to *TELCOM*.

How to setup *Dialm8*

We assume you have formatted your phone number list in ADRS.DO to be compatible with *TELCOM*. With the addition of one or two definition lines in your file, you will be ready to use

(Vance Socci is a computer consultant and partner in Intra-Cept Technologies. A professional musician as well, he plays both keyboard and saxophone. In one of his current projects he is working to link the synthesizer keyboard directly to the computer.)

Dialm8.

First, *Dialm8* must know what area code the numbers in your directory have if the number is only seven digits long, that is, if you have left out the area code. To do this, insert a line at the beginning of your ADRS.DO file in the form "DA=area code," where area code is the area code of your seven digit numbers. For example, if you lived in area code 201, the line to insert would be DA=201. Do this in column one of the beginning of ADRS.DO. (The quote characters in the examples are not to be entered on the line.) The "DA=" must appear in column one of the line, or it will not be recognized. If you leave out this line, *Dialm8* will assume you live near where it was born, which is area code 408.

Next, an optional prefix definition line can be inserted. *Dialm8* inserts the text defined in this line for every call, unless the prefix is overridden by the "Pref" command. If this line is not present, a blank prefix is set. The prefix line has the form "PR =prefix text." For example, "PR=9=" in column one is the line necessary to have the default prefix be 9 followed by a two second wait (caused by the =).

Running *Dialm8*

Now that you have set up your ADRS.DO file, run *Dialm8*, which will show its top level commands on the

label line. Commands may be entered either via the keyboard or by depressing the corresponding function button.

Data given to the command (for example, the phone number for the Call command) is entered after the command with a space between the command and the data. Pressing ENTER then causes the command with its data to be executed. For example, "Call 5551212" will tell *Dialm8* to dial 5551212.

The operation of *Dialm8* is analogous to that of *TELCOM* for voice calls. Computer calls will still need to be done through *TELCOM*, as *Dialm8* doesn't implement the terminal simulation.

The Find command functions identically to the corresponding *TELCOM* command. It will find successive occurrences of the string you enter and give you the options of Call, More, or Quit. The Find command ignores the case of alphabetic characters like *TELCOM* does in the search string. The only functional difference from *TELCOM* is that *Dialm8* inserts the prefix string and either adds or deletes the area code, as required.

The Call command functions identically to the corresponding *TELCOM* function, except that a blank argument will redial the last number dialed (this number is reset when leaving *Dialm8*

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Model 100 also works as an appointment calendar, address book, phone directory and telephone

auto-dialer. You can even write your own BASIC programs! In addition, Model 100 features a full-size typewriter keyboard, is powered by batteries or optional AC adapter, and retains all data with power off.

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with the Exit or Menu commands). As in the Find command, *Dialm8* adds the prefix and does area code processing on the number.

The Pref command overrides the prefix specified in the ADRS.DO command, if any. A blank argument to the command will result in no prefix.

The Area command tells *Dialm8* the area code you are dialing from. When *Dialm8* first runs, it sets your dialing area code to your default area code as specified in the ADRS.DO file.

The Busy command, which accepts an argument of the number of seconds between redials, will set things up so that the next number you call will be redialed over and over until you hit the spacebar. This is intended to be used when getting through to a chronically busy number. Set the busy timer long enough for the call to go through so you can determine if it's still busy. If it is, just let *Dialm8* dial the number again. If it isn't, immediately press the spacebar before the dialing starts again and you will get the "Dial" prompt. At this point, your call will either be ringing or answered. The effects of the busy command only last for one call. Further

busy mode calls will need separate Busy commands to setup the cycle time.

Program Description

115	Load case conversion program
120-144	Setup default area code and prefix from ADRS.DO
150-200	Setup screen and function keys
210-230	Command scanner
240-385	Find Command and submenu
400-420	Find command phone number extraction
500-605	Phone number pre-processing (add/subtract area code, add prefix)
610-800	Setup for call to ROM dialing routine
900	Call to ROM dialing routine
920-1000	Busy cycle loop
1900-2400	Routine to convert X\$ to upper case
4000-4110	Menu and Exit commands

4300

60000-60300

60400-61000

Variables:

X\$, Y\$, A\$
PH\$

P\$
DA\$

AC\$

P

RP%

Routine to restore function keys, clear screen

Assembly language routine to convert lower to upper case to decrease Find command scan time.

Subroutine to allocate free memory and load the assembly language routine into it

String temporaries
Argument to commands
Phone number for 600
Prefix
Default Area code of ADRS.DO
Current dialing area code
Address of assembly language case conversion routine
Repeat loop count for BUSY

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The listing:

```

100 'DIALM8 by Vance Socci
115 GOTO 60000 'Setup case conversion
120 DA$="408" : 'Default Area Code
122 OPEN "ADRS.DO" FOR INPUT AS 1
124 IF EOF(1) THEN 150
126 LINE INPUT#1,X$
128 I%=INSTR(1,X$,"=")
130 IF I%=0 THEN 124
132 Y$=LEFT$(X$,2)
134 IF Y$="DA" THEN DA$=RIGHT$(X$,LEN(X$)-3):GOTO 124
136 IF Y$="PR" THEN P$=RIGHT$(X$,LEN(X$)-3)
140 AC$=DA$
144 CLOSE 1
150 SCREEN 0,0:CLS
160 KEY 1,"Find "
162 KEY 2,"Call "
164 KEY 3,"Pref "
166 KEY 4,"Area "
170 KEY 5,"Busy "
172 KEY 6,""
175 KEY 7,"Exit"+CHR$(13)
177 KEY 8,"Menu"+CHR$(13)
180 SCREEN 0,1
200 LINE INPUT "Dial:";X$
205 IF X$="" GOTO 200
210 GOSUB 1900 : 'CONVERT TO UPPER CASE
212 PH$="":IF LEN(X$)<6 THEN 217
215 PH$=RIGHT$(X$,LEN(X$)-5)
217 X$=LEFT$(X$,4)
220 IF X$="CALL" THEN 500
221 IF X$<>"BUSY" THEN 225
223 IF PH$="" THEN RP%=1000 ELSE RP%=VAL(PH$)*180
224 GOTO 200
225 IF X$="PREF" THEN P$=PH$:GOTO 200
227 IF X$="AREA" THEN AC$=PH$:GOTO 200
228 IF X$="MENU" THEN 4000
229 IF X$="EXIT" THEN 4100
230 IF X$<>"FIND" THEN PRINT"?":GOTO 200
235 CLOSE 1
240 OPEN "ADRS.DO" FOR INPUT AS 1
250 IF EOF(1) THEN 150
260 LINE INPUT#1,X$:Y$=X$:CALL P,0,VARPTR(X$)
280 I%=INSTR(1,X$,PH$)
290 IF I%=0 THEN 250
300 PRINT Y$
320 KEY 2,"Call"+CHR$(13)
330 KEY 3,"More"+CHR$(13)
340 KEY 4,"Quit"+CHR$(13)
350 KEY 1,"":KEY 5,"":KEY 7,"":KEY 8,"":
SCREEN 0,1
360 A$=X$:LINE INPUT X$:CALL P,0,VARPTR(X$):Y$=A$:A$=X$:X$=Y$
370 IF A$="CALL" GOTO 400
380 IF A$="QUIT" GOTO 150
385 IF A$="MORE" GOTO 250:ELSE 360
400 I%=INSTR(1,X$,":")
410 IF I%=0 THEN 200
420 PH$=RIGHT$(X$,LEN(X$)-I%)
500 IF PH$="" THEN PH$=LN$:GOTO 610
510 I%=INSTR(1,PH$,":")
520 IF I%=0 THEN PH$=PH$+"":GOTO 540
530 PH$=LEFT$(PH$,I%)
540 IF LEN(PH$)>8 THEN 580
550 IF AC$=DA$ THEN 600
560 PH$=DA$+PH$:GOTO 600
580 IF LEFT$(PH$,3)=AC$ THEN PH$=RIGHT$(PH$,LEN(PH$)-3)
600 PH$=P$+PH$
605 LN$=PH$
610 M=VARPTR(PH$)
700 AD=PEEK(M+1)+PEEK(M+2)*256
800 PRINT"Calling. . ."
900 CALL 21293,0,AD
920 IF RP%=0 THEN 950
930 FOR I%=1TORP%
935 IF INKEY$="" THEN 950
937 NEXT I%
940 GOTO 900
950 PRINT""
960 RP%=0
1000 GOTO 150
1900 CALL P,0,VARPTR(X$)
2400 RETURN
4000 GOSUB 4300
4010 MENU
4100 GOSUB 4300
4110 END
4300 CALL 23164,0,23366
4400 CALL 27795
4450 SCREEN 0,0
4500 RETURN
60000 'Mini assembly code loader
60300 DATA 78,35,126,35,102,111,126,254,9
7,218,-20,0,254,123,210,-20,0,214,32,119
,35,13,200,195,-6,0
60400 C%= 26
60410 P=MAXRAM-C%
60420 CLEAR 1000,P-1
60430 C%= 26
60440 P=MAXRAM-C%
60520 Q=P
60600 FOR I%=1TOC%:READ X%
60620 IF X%>=0 THEN POKE Q,X%:Q=Q+1:GOTO 60650
60630 R=P-X%
60640 POKE Q,(R/256-INT(R/256))*256:POKE Q+1,INT(R/256)
60645 Q=Q+2:READ X%:I%=I%+1
60650 NEXT I%
61000 GOTO 120

```


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Appending PoCo Files

see PCM 3/84
p.6

By Ronald Paludan

Frequently, we may find a need to append two text files or merge two separate BASIC programs. This can easily be accomplished by a simple BASIC program called *APPND*. The trick is to use the *APPND* mode when operating a file.

To operate the program, RUN it and respond to 'FIRST FILE?' by entering the file name that you want to append onto. Answer 'SECOND FILE?' with the name of the file that you want to append onto the end of the first. When the *APPND* program is done, the combined file will be stored under the first filename.

In order to merge two BASIC programs, you must SAVE both of them in ASCII format (SAVE "RAM:filename", A). The *APPND* program will append the second program onto the first. Next, load the newly merged program from BASIC using the filename of the first program (LOAD "RAM:filename"). The line numbers will automatically be placed in the proper order. Note that if a program line in the second program matches a line in the first, the line from the second program will replace the first.

Here, in Figure 1, are two programs before merging. Program one was stored under the filename "PROG1.DO" and program two under "PROG2.DO".

Figure 1

```
(PROG1.DO)
10 REM PROG1 LINE 10
20 REM PROG1 LINE 20
30 REM PROG1 LINE 30
```

```
(PROG2.DO)
15 REM PROG2 LINE 15
25 REM PROG2 LINE 25
30 REM PROG2 LINE 30
```

After using *APPND* and loading PROG1 into BASIC, the two programs have been merged (Figure 2). Line 30 from PROG2 has replaced line 30 in PROG1.

Figure 2

```
10 PROG1 LINE 10
15 PROG2 LINE 15
20 PROG1 LINE 20
25 PROG2 LINE 25
30 PROG2 LINE 30
```

I hope this program saves many of you from redundant typing.

The listing:

```
10 CLEAR500:MAXFILES=2:INPUT"FIRST FILE"
;F1$:INPUT"SECOND FILE";F2$:F1$="RAM:"
20 OPEN F1$ FOR APPEND AS 1:OPEN F2$ FOR
INPUT AS 2
30 LINE INPUT#2,A$:PRINT#1,A$
40 IF EOF(2)THEN CLOSE ELSE 30
```


PREPARE YOUR NEXT EXPENSE REPORT WITH *EXPNSE*

BY DONALD J. HANSON



When Tandy first introduced the Model 100, I saw it as the perfect companion for the traveling business person. The Model 100's firmware provides the note taking, appointment scheduling, address filing, and telecommunications capabilities the average business traveler requires. One function that is missing is a program for the maintenance of a company expense report. While the manual hints that *SCHEDL* could be used for this application, I felt a dedicated program could better serve my needs. The result is *EXPNSE*.

EXPNSE is a menu-oriented BASIC program which will maintain two expense reports. Each report can have 11 categories for each of seven days. The daily and category totals can be displayed on the LCD screen and a report with all entries and totals can be output to a printer (LPT:) or to a RAM file (REPORT.DO). The RAM file can then be edited via *TEXT* or transmitted to the office via *TELCOM*.

EXPNSE can be broken down into seven modules. The first module (lines 10—1520) explains the function of the program, defines the variables and dimensions arrays. Three arrays are used within the program. The first array,

NC(C), is a string array which is used to define the expense categories within the report. The days used in the report are defined in a string array called ND(C).

The expense data array, E(D,C), is a double-precision, two-dimensional array used to store all of the expense report data. This array can best be visualized as a spreadsheet with the expense categories as columns and the days as rows. The variable D points to a specific day and the variable C points to a specific category.

Primary Menu

The program's primary menu (2000—2280), provides access to four functions: data entry, display of totals, report printing, and ending the program. The desired function is selected via the INPUT statement in line 2180 and then routed via the ON . . . GOTO statement in line 2230. Any non-valid entries will be trapped and will cause an error subroutine to be called and the menu to be redisplayed.

Subroutine Library

The next module I'd like to discuss is the last one (7000—8760). This module is a Subroutine Library which contains seven subroutines which are called by the other program modules. The first routine (7080—7230) beeps and dis-

plays the message "INVALID SELECTION." It is called whenever a non-valid menu entry is selected.

File Loaded?

The routine in lines 7250 to 7360 checks to determine if one of the two data files (WEEK1.DO and WEEK2.DO) has been loaded into the array E(D,C). The status of the file loaded flag (L) will be equal to 1 when a file is in memory. If a file has not been loaded, this routine will call the select and load file routine at 7380—7870.

Select and Load

The Select and Load File routine begins by resetting the file selected variable (FS) to zero. Lines 7480 through 7550 display the menu which allows us to select the file we wish to load, WEEK1 or WEEK2. The Invalid Selection routine is called in the case of a non-valid menu selection.

Once a file has been selected, the routine will assign a file name to the variable NF and will check to see if that file is currently in RAM. It does this by attempting to open the file for input in line 7660. If the file does not exist, a "File Not Found" error will be generated and program control will transfer to line 7950 (Create File) as defined by the ON ERROR statement in 7650.

If a data file already exists in RAM, the program will begin to load the file into the array E(D,C). This section of code begins by checking to see if we are at the end of the file (7710). This line is necessary for those times when we allocate a file for the first time for the purpose of entering data. If this line were not present, the program would generate an "Input Past End of File" error (54) because the newly allocated file has no data in it.

Lines 7730 through 7780 consist of a FOR-NEXT loop which loads the data file into the array E(D,C). Since we know how much data we write to the file, it is not necessary to check for the end of the file. After the file has been loaded the file loaded flag (L) is set to one (1) and the file saved flag (S) is set to one (1).

Create a File

The Create File subroutine (7890—8120) allocated one of the two data files (WEEK1.DO or WEEK2.DO) when the selected file does not exist. The program checks to see if error 52 (File Not Found) has been generated (7980). If any other error is generated, the program branches to line 8050, beeps, prints an error message, and aborts. If an error 52 is detected, the selected file is created by opening it for output and then closing it (7990—8010). Program control will then transfer back to line 7650 and the program will attempt to load the data file into the array. Since the newly created file has no data, program control will transfer back to the enter data module.

Items Totaled?

The Check Totals Flag routine (8140—8240) checks the status of the totaled flag T. Any time the array totals are calculated, T is set to one. If data is entered after this calculation, the flag is reset to zero, indicating that the totals

must be recalculated. If recalculation is necessary, this routine will branch to the Calculate Totals routine at 8260—8600.

"The program's primary menu . . . provides access to four functions: data entry, display of totals, report printing, and ending the program."

Calculate Totals

The totaling routine begins by zeroing all existing totals (8340—8410). This is necessary to prevent the old totals from being added to the new totals. Zeroing is accomplished through a FOR-NEXT loop, which sets each of the category 11 totals and each of the daily seven totals to zero. The routine then uses additional FOR-NEXT loops to calculate the daily totals (8420—8470), the category totals (8480—8530) and the grand totals (8540—8570). The routine ends by setting the Totaled Flag (T) to one.

Display Category Totals

The last subroutine in the library is only called by the Display Totals module. It is located at lines 8620—8760 and is used for displaying menu titles in the Display Totals mode.

Data Entry

Data entry is accomplished through

the Enter Data module at lines 3000—3860. When selected, this module begins by branching to the File Loaded? subroutine at 7250. After a data file has been loaded or created the program will reset the totaled (T) and saved (S) flags indicating that new data has been entered and must be recalculated and saved prior to ending the program.

The Enter Data module displays a menu (3140—3270) which allows the user to enter data for a specific day, or allows them to return to the primary menu. The program utilizes the user's selection (3250) to calculate the day pointer (D) for array E (3290). It will then check to see if the user has selected a valid menu item (3310).

Once the user has selected to enter data for a given day, the program enters a data entry loop (3380—3520). The loop first checks to determine if any previous data has been entered for this day and category (3430). This is accomplished by checking to see if the value E(D,C) is anything other than a zero. If the value E(D,C) does not equal zero, the program assumes that previous data has been entered and branches to line 3620.

If E(D,C) equals zero the program will prompt the user to enter data for that category (3440—3490). At this point valid data may be entered, or the user can return to the day selection menu by entering a negative number which will exit the loop (3510). If valid data is entered, it will be loaded into the array (3490) and the program will return to the top of the loop (3380) and request data for the next category. The loop will prompt the user for each category and when exited (3510) or completed (3540) will return to the Day Selection menu (3120).

If the loop detects previously entered data (3430), E(D,C) does not equal zero, the program will branch to line 3620 where the existing data will be dis-

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played and the user will be asked if they wish to change it. An answer of "N" or "n" will return to the top of the loop (3730) and the next category. An answer of "Y" or "y" will cause the program to prompt the user to enter a new amount (3760—3840). Once this is done the program will branch back to the top of the data entry loop (3520).

Display Totals

The Display Totals module (4000—4500) will display the daily and category totals in three screens of information. When first selected, the program will branch to the File Loaded subroutine (7300) and will check to see if a file is loaded and will load one if necessary. The next routine called is "totaled?" (8210) which checks to see if the totals must be recalculated. If this is the case, the Calculate Totals routine (8260) will be called. Once totals have been calculated, the program will display the daily totals in the first screen of information (4120—4280) and the category totals in the two succeeding screens (4300—4500). The category totals are displayed with the aid of the subroutine at (8620—8760). The program is paused after each screen by using an INPUT statement with the dummy string variable A. After the last screen has been displayed, the program will return to the primary menu (2060).

Print Report

The Print Report module (5000—5670) allows the user to print an expense report at the printer (LPT:), or to a RAM file called REPORT.DO. When this module is selected, it begins by utilizing the Subroutine Library to determine if a file has been loaded and if totals need to be recalculated. The program then displays a menu (5120—5200) which allows the user to select the desired output device. This selection assigns the proper value to the name of output device variable number (5240, 5270). Once selected, the program prompts the user for their name (5300) and the date (5340) as it is to appear on the report.

The printer is treated as an output file to allow one program segment to print a report to LPT: and to RAM. This program begins by opening the selected output file (5420) and then prints a report title (5440—5500). The FOR-NEXT loop at 5520 through 5540 reads the array E(D,C) and prints out the first six categories of the report. The loop at 5610—5630 prints the remaining report categories. After printing, the program will return to the primary menu.

End Program

The last section of the program is the END module (6000—6410). It begins by checking the status of the File Loaded? flag (L) to determine if a data file is loaded (6120). If a file is not loaded, the program ends and returns to the Model 100 menu (6380—6410). If a file is loaded (L=1) the program will ask the operator if they wish to have that file deleted from RAM (6140—6180). When the operator answers "Y" or "y" the file will be killed (6360) and the program will end. Any other response to this question will cause the program to check the status of the File Saved? flag (S) (6200). If the file does not need to be saved (S=1) the program will end. When the file must be saved, it will be accomplished through the FOR-NEXT loop in lines 6270 through 6330. Once saved, the program will end and control will return to the Model 100's main menu.

Summary

In the process of writing *EXPENSE*, I discovered a peculiarity in Model 100 BASIC which may be of interest to others. You'll notice that the format for the PRINT USING statements in lines 4130—4190 and 4310—4360 is specified by a string variable. Conversely, the format specification for the PRINT USING statements in lines 5490, 5530, 5580, and 5620 is literal. All of the PRINT USING formats started out being defined by string variables, but for some reason the statements in lines 5490, 5530, 5580, and 5620 had a tendency to generate errors. This same code generated different errors on different occasions. Two common errors were "Type Mismatch" and "Out of Memory." On the occasions when the program did not abort due to an error, the program would print REPORT.DO but part of it would be garbage.

When one encounters a program error, the first thing to suspect is the code. After double checking the code and trying the program in another 100, I still couldn't get things to work, so I reported the problem to Tandy. At the same time I developed a short set of code which would duplicate the problem and left it on CompuServe's Model 100 SIG. A gentleman named Bob Lakin left me a message indicating that the problem had something to do with the maximum allowable record size in RAM. He suggested that I change the string variable to a literal and sure enough, it solved the problem. A big thank you to Bob!

After looking through the Model 100's manuals, I discovered that the use

of string variables for format specifiers was not documented with the PRINT USING statement. Whether this was an oversight or whether it's not permitted is hard to say. Obviously the strings work in some cases. Hopefully, Tandy will provide a solution soon.

I have found *EXPNSE* to be very useful on business trips and I hope others find it equally helpful. Changing the program to meet the specific needs of your company expense report should be quite easy. If any of you have questions or comments on *EXPNSE*, please feel

free to leave me a message on CompuServe via E-Mail or the Model 100 SIG.

NOTE: For the sake of memory conservation and ease of typing, a condensed listing of *EXPNSE* follows this expanded, explanatory version.

The listing:

```

10 REM EXPNSE V1.9 16JULY83
20 REM Donald J. Hanson [71435,1465]
30 REM Copyright 1983 All Rights Reserv
ed
40 REM A program to maintain up to two
50 REM weekly expense reports on a
60 REM TRS-80 Model 100. The program
70 REM allows the user to enter data,
80 REM display totals, and print an
90 REM expense report. Data is stored i
n
100 REM two RAM files; WEEK1.DO and
110 REM WEEK2.DO. The entire report is
120 REM represented in memory as the
130 REM array E(D,C); where D indicates
140 REM the day and C indicates expense
150 REM catagory
160 REM
170 REM Define number of Files
180 MAXFILES=2
190 REM
200 REM Define INPUT/OUTPUT Buffers
210 REM Buffer #1 = Input
220 REM Buffer #2 = Output
230 REM
240 REM Define Integer Variables
250 REM
260 REM T is used as a flag to
270 REM indicate if totals have
280 REM been calculated. T is set
290 REM to 1 after a calculation
300 REM has been performed. T is
310 REM set to 0 when new data is
320 REM entered
330 REM
340 REM L is used as a flag to
350 REM indicate if a data file has
360 REM been loaded.
370 REM
380 REM MS Indicates which function
390 REM has been selected from the
400 REM primary menu.
410 REM
420 REM SD is used as a counter for a
430 REM screen delay routine.
440 REM
450 REM FS is used to indicate which
460 REM data file has been selected
470 REM as input.
480 REM
490 REM DS is used to indicate the day
500 REM selected for the data being
510 REM entered.
520 REM
530 REM OS is used to indicate which
540 REM output device has been
550 REM selected for the printing
560 REM of the report.
570 REM
580 REM D points to the proper day
590 REM within the array.
600 REM
610 REM C points to the proper
620 REM catagory within the array.
630 REM
640 REM S is used to indicate if the
650 REM array needs to be saved.
660 REM
670 DEFINT C, D, F, L, M, O, S, T
680 REM
690 REM Define Double Precision Variable
s
700 REM
710 REM E(D,C) is the array used to
720 REM represent expenses.
730 REM
740 REM Define String Variables
750 REM
760 REM ND(D) is used to define days.
770 REM
780 REM NC(C) is used to define the
790 REM expense catagories.
800 REM
810 REM NF is the name of the data file
820 REM to be used.
830 REM
840 REM N is the name of the person
850 REM filing the expense report.
860 REM
870 REM A is a dummy variable used
880 REM with an INPUT statement. It
890 REM is used to halt the screen
900 REM display.
910 REM
920 REM W is used to indicate the last
930 REM day of the week for the
940 REM given expense report.
950 REM
960 REM NO represents the name of the
970 REM output device for the PRINT
980 REM REPORT module.
990 REM
1000 REM P1-2 are PRINT USING formats.
1010 REM

```



```

1020 REM PI is used to enter display
1030 REM    INVERSE mode.
1040 REM
1050 REM PN is used to enter display
1060 REM    NORMAL mode.
1070 REM
1080 DEFSTR A, N, P, W
1090 REM
1100 REM    Set up PRINT formats
1110 P1="\ \ $$$$."
1120 P2="\ \ $$$$."
1130 REM
1140 REM    Set up PRINT escape sequences
1150 REM Print in Inverse Mode
1160 PI=CHR$(27)+"p"
1170 REM Print in Normal Mode
1180 PN=CHR$(27)+"q"
1190 REM
1200 REM Dimension Arrays
1210 REM Expense Item Array
1220 DIM E(7,11)
1230 REM Category Descriptor Array
1240 DIM NC(11)
1250 REM Day Descriptor Array
1260 DIM ND(9)
1270 REM
1280 REM Set up expense categories
1290 NC(0)="LODGING"
1300 NC(1)="AUTO"
1310 NC(2)="AIR FARE"
1320 NC(3)="CAR RENTAL"

```

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```

1330 NC(4)="TAXI,BUS"
1340 NC(5)="PARK,TOLLS"
1350 NC(6)="BREAKFAST"
1360 NC(7)="LUNCH"
1370 NC(8)="DINNER"
1380 NC(9)="ENTERTAIN"
1390 NC(10)="MISC."
1400 NC(11)="DLY TOTAL"
1410 REM
1420 REM Define Day Array
1430 ND(0)="SUN"
1440 ND(1)="MON"
1450 ND(2)="TUE"
1460 ND(3)="WED"
1470 ND(4)="THU"
1480 ND(5)="FRI"
1490 ND(6)="SAT"
1500 ND(7)="TOT"
1510 ND(8)="DAY"
1520 REM
2000 REM *****
2010 REM *
2020 REM *    Display Primary Menu    *
2030 REM *
2040 REM *****
2050 REM
2060 CLS
2070 REM Reset Menu Select (MS)
2080 MS=0
2090 REM REM Display Menu
2100 PRINT @ 83,"1> ENTER DATA"
2110 PRINT @ 163,"2> DISPLAY TOTALS"
2120 PRINT @ 104,"3> PRINT REPORT"
2130 PRINT @ 184,"4> END"
2140 REM Shift to INVERSE display
2150 PRINT PI;
2160 PRINT @ 10," ** EXPENSE MENU ** "
2170 PRINT @ 250," Select Function ";
2180 INPUT MS
2190 REM Shift to NORMAL display
2200 PRINT PN;
2210 REM
2220 REM Test for selected function
2230 ON MS GOTO 3070, 4060, 5060, 6120
2240 REM Jump to INVALID SELECTION routine
2250 GOSUB 7170
2260 REM Redisplay Primary Menu
2270 GOTO 2060
2280 REM
3000 REM *****
3010 REM *
3020 REM *    Enter Data Module    *
3030 REM *
3040 REM *****
3050 REM
3060 REM Jump to FILE LOADED? routine
3070 GOSUB 7300
3080 REM Reset DATA SAVED flag (S)
3090 S=0

```



```

3100 REM Reset TOTALED? flag (T)
3110 T=0
3120 CLS
3130 REM Display Day Selection Menu
3140 PRINT @ 43,"1> SUN"
3150 PRINT @ 123,"2> MON"
3160 PRINT @ 203,"3> TUE"
3170 PRINT @ 56,"4> WED"
3180 PRINT @ 136,"5> THU"
3190 PRINT @ 216,"6> FRI"
3200 PRINT @ 69,"7> SAT"
3210 PRINT @ 149,"8> MENU"
3220 REM Shift to inverse display
3230 PRINT PI;
3240 PRINT @ 293," Select One ";
3250 INPUT DS
3260 REM Shift to normal display
3270 PRINT PN;
3280 REM Set Day Pointer
3290 D=DS-1
3300 REM Check for Invalid Entry
3310 IF D>=0 AND D<=6 THEN 3380
3320 IF D=7 THEN 2060
3330 REM Jump to INVALID SELECTION
3340 GOSUB 7170
3350 REM Redisplay Day Menu
3360 GOTO 3120
3370 REM Data Entry Loop
3380   FOR C=0 TO 10
3390     CLS
3400     REM Reset A
3410     A="x"
3420     REM Test for existing data
3430     IF E(D,C)<>0 THEN 3620
3440     PRINT PI;
3450     PRINT @ 18," ";ND(D);" "
3460     PRINT PN;
3470     PRINT @ 92,"Enter Amount For"
3480     PRINT @ 172, NC(C);
3490     INPUT E(D,C)
3500     REM Check for Return to Menu
3510     IF E(D,C)<0 THEN 3560
3520   NEXT C
3530 REM Jump Over Reset to 0
3540 GOTO 3570
3550 REM Reset Entry to Zero
3560 E(D,C)=0
3570 REM Reset Day Select (DS)
3580 DS=0
3590 REM Return to Day Menu
3600 GOTO 3120
3610 REM Display Current Value
3620 CLS
3630 PRINT PI;
3640 PRINT @ 17," ";ND(D);" "
3650 PRINT PN;
3660 PRINT @ 92,"Current Amount For:"
3670 PRINT @ 132, NC(C);" = "
3680 PRINT @ 142, USING "$###.##";E(D,C)
3690 PRINT @ 212,"Change? (Y/N)"

```

```

3700 PRINT @ 225," ";
3710 INPUT A
3720 REM Get next item
3730 IF A="N" OR A="n" THEN 3520
3740 REM Check for error, redisplay
3750 IF A<>"Y" AND A<>"y" THEN 3620
3760 REM Enter NEW Amount
3770 CLS
3780 PRINT PI;
3790 PRINT @ 18, ND(D)
3800 PRINT PN;
3810 PRINT @ 90,"Enter NEW Amount for"
3820 PRINT @ 172, NC(C)
3830 PRINT @ 181," ";
3840 INPUT E(D,C)
3850 REM Get next item
3860 GOTO 3520
3870 REM
4000 REM *****
4010 REM *
4020 REM *   Display Totals Module   *
4030 REM *
4040 REM *****
4050
4060 CLS
4070 REM Jump to FILE LOADED? routine
4080 GOSUB 7300
4090 REM Jump to TOTALED? routine
4100 GOSUB 8210
4110 REM Display Daily Totals
4120 CLS
4130 PRINT @ 80, USING P1; ND(0), E(0,1)
4140 PRINT @ 160, USING P1; ND(1), E(1,1)
4150 PRINT @ 240, USING P1; ND(2), E(2,1)
4160 PRINT @ 94, USING P1; ND(3), E(3,1)
4170 PRINT @ 174, USING P1; ND(4), E(4,1)
4180 PRINT @ 254, USING P1; ND(5), E(5,1)
4190 PRINT @ 108, USING P1; ND(6), E(6,1)
4200 REM Inverse Text
4210 PRINT PI;
4220 PRINT @ 0," DAILY TOTALS "
4230 PRINT @ 188," <ENTER> "
4240 PRINT @ 227," to Continue ";
4250 REM Return to normal display
4260 PRINT PN;
4270 PRINT @ 267,"";
4280 INPUT A
4290 REM Display Catagory Totals
4300 CLS
4310 PRINT @ 80, USING P2; NC(0), E(7,0)
4320 PRINT @ 160, USING P2; NC(1), E(7,1)
4330 PRINT @ 240, USING P2; NC(2), E(7,2)

```



```

)
4340 PRINT @ 20, USING P2; NC(3), E(7,3)
4350 PRINT @ 100, USING P2; NC(4), E(7,4)
)
4360 PRINT @ 180, USING P2; NC(5), E(7,5)
)
4370 REM Jump to Display Titles Routine
4380 GOSUB 8690
4390 REM Display Next Page
4400 CLS
4410 PRINT @ 80, USING P2; NC(6), E(7,6)
4420 PRINT @ 160, USING P2; NC(7), E(7,7)
)
4430 PRINT @ 240, USING P2; NC(8), E(7,8)
)
4440 PRINT @ 20, USING P2; NC(9), E(7,9)
4450 PRINT @ 100, USING P2; NC(10), E(7,10)
4460 PRINT @ 180, USING P2; NC(11), E(7,11)
)
4470 REM Jump to Display Titles Routine
4480 GOSUB 8690
4490 REM Return to Primary Menu
4500 GOTO 2060
4510 REM
5000 REM *****
5010 REM *
5020 REM * PRINT REPORT MODULE *
5030 REM *
5040 REM *****
5050 REM
5060 CLS
5070 REM Jump to FILE LOADED? Routine
5080 GOSUB 7300
5090 REM Jump to Totaled routine
5100 GOSUB 8210
5110 REM Display PRINT TO: menu
5120 CLS
5130 PRINT PI;
5140 PRINT @ 14, " PRINT TO: "
5150 PRINT @ 253, " Select One "
5160 PRINT PN;
5170 PRINT @ 129, "1> PRINTER"
5180 PRINT @ 144, "2> RAM"
5190 PRINT @ 267, " ";
5200 INPUT OS
5210 ON OS GOTO 5240, 5270
5220 REM Jump to INVALID SELECTION routine
5230 GOSUB 7170
5240 NO="LPT:"
5250 REM Jump to Enter Name
5260 GOTO 5290
5270 NO="RAM:REPORT.DO"
5280 REM Enter Name
5290 CLS
5300 PRINT @ 165, "Enter Name";
5310 INPUT N
5320 REM Enter Report Date
5330 CLS

```

```

5340 PRINT @ 162, "Enter Last Day of Report (MM/DD/YY)"
5350 PRINT @ 256, " ";
5360 INPUT W
5370 REM Print Report
5380 CLS
5390 BEEP
5400 PRINT @ 128, "Printing To: "; NO
5410 REM Assign Output Device
5420 OPEN NO FOR OUTPUT AS 2
5430 REM Print Header
5440 PRINT #2, TAB(25); "** EXPENSE REPORT **"
5450 PRINT #2, " "
5460 PRINT #2, N;
5470 PRINT #2, TAB(30); "For Week Ending: "; W
5480 PRINT #2, " "
5490 PRINT #2, USING "\ \ \ \ \ \ \ \ \ \"; ND(8), NC(0), NC(1), NC(2), NC(3), NC(4), NC(5)
5500 PRINT #2, " "
5510 REM Enter PRINT loop
5520 FOR D=0 TO 7
5530 PRINT #2, USING "\ \ \ \ \ \ \ \ \ \"; ND(D), E(D,0), E(D,1), E(D,2), E(D,3), E(D,4), E(D,5)
5540 NEXT D
5550 REM Print Second Page
5560 REM Print Header
5570 PRINT #2, " "
5580 PRINT #2, USING "\ \ \ \ \ \ \ \ \ \"; ND(8), NC(6), NC(7), NC(8), NC(9), NC(10), NC(11)
5590 PRINT #2, " "
5600 REM Enter PRINT loop
5610 FOR D=0 TO 7
5620 PRINT #2, USING "\ \ \ \ \ \ \ \ \ \"; ND(D), E(D,6), E(D,7), E(D,8), E(D,9), E(D,10), E(D,11)
5630 NEXT D
5640 CLOSE 2
5650 BEEP
5660 REM Return to Primary Menu
5670 GOTO 2060
5680 REM
6000 REM *****
6010 REM *
6020 REM *
6030 REM * END MODULE *
6040 REM *
6050 REM *
6060 REM *****
6070 REM
6080 REM Saves data file (NF) to RAM
6090 REM and returns to MENU

```



```

6100 REM
6110 REM Check if a file is loaded
6120 IF L=0 THEN 6380
6130 REM Delete File ?
6140 CLS
6150 PRINT @ 132,"Delete ";NF+".DO"
6160 PRINT @ 175,"(Y/N)";
6170 INPUT A
6180 IF A="Y" OR A="y" THEN 6360
6190 REM Check to see if file needs to b
e saved
6200 IF S=1 THEN 6380
6210 REM Save array to RAM
6220 CLS
6230 PRINT @ 175,"Saving Array"
6240 REM Open Output File
6250 OPEN NF FOR OUTPUT AS 2
6260 REM Enter Save loop
6270   FOR D=0 TO 7
6280     FOR C=0 TO 11
6290       E=E(D,C)
6300       PRINT #2, E
6310     NEXT C
6320   NEXT D
6330 CLOSE 2
6340 REM Skip over KILL
6350 GOTO 6380
6360 KILL NF+".DO"
6370 REM Reset MAXFILES
6380 MAXFILES=1
6390 REM Exit EXPNSE and return to MENU
6400 MENU
6410 END
6420 REM
7000 REM *****
7010 REM *
7020 REM *
7030 REM *   Subroutine Library
7040 REM *
7050 REM *
7060 REM *****
7070 REM
7080 REM -----
7090 REM +
7100 REM + Invalid Selection Routine +
7110 REM +
7120 REM -----
7130 REM
7140 REM Displays "INVALID SELECTION"
7150 REM when invalid menu item is
7160 REM selected.
7170 CLS
7180 PRINT @ 132,"INVALID SELECTION"
7190 BEEP
7200 REM Timer Loop
7210   FOR SD=1 TO 500
7220   NEXT SD
7230 RETURN
7240 REM
7250 REM -----

```

```

7260 REM +
7270 REM +   File Loaded Routine
7280 REM +
7290 REM -----
7300 REM
7310 REM Checks to see if a data file
7320 REM is loaded.
7330 IF L=1 THEN 7360
7340 REM Jump to Load File Routine
7350 GOSUB 7440
7360 RETURN
7370 REM
7380 REM -----
7390 REM +
7400 REM +   Select and Load File
7410 REM +
7420 REM -----
7430 REM
7440 CLS
7450 REM Reset FS
7460 FS=0
7470 REM Display FILE Menu
7480 PRINT @ 125,"1> WEEK1.DO"
7490 PRINT @ 145,"2> WEEK2.DO"
7500 PRINT PI;
7510 PRINT @ 14," FILE MENU "
7520 PRINT @ 253," Select One";
7530 INPUT FS
7540 PRINT PN;
7550 ON FS GOTO 7610, 7630
7560 REM Jump to Invalid Selection Routi
ne
7570 GOSUB 7170
7580 REM Redisplay File Menu
7590 GOTO 7440
7600 REM Assign File Names
7610 NF="WEEK1"
7620 GOTO 7650
7630 NF="WEEK2"
7640 REM Determine if File exists
7650 ON ERROR GOTO 7950
7660 OPEN NF FOR INPUT AS 1
7670 REM Load Array
7680 CLS
7690 PRINT @ 128,"Loading Data Into Arra
y"
7700 REM Check for EOF
7710 IF EOF(1) THEN 7790
7720 REM
7730   FOR D=0 TO 7
7740     FOR C=0 TO 11
7750       INPUT #1, E
7760       E(D,C)=E
7770     NEXT C
7780   NEXT D
7790 CLOSE 1
7800 REM Set File Loaded Flag (L)
7810 L=1
7820 REM Reset Error Trap
7830 ON ERROR GOTO 8050

```



```

7840 REM
7850 REM Set Saved Flag to 1
7860 S=1
7870 RETURN
7880 REM
7890 REM -----
7900 REM + +
7910 REM + Create File +
7920 REM + +
7930 REM -----
7940 REM
7950 CLS
7960 REM Check for anything other than
7970 REM "File Not Found" Error
7980 IF ERR<>52 THEN 8050
7990 OPEN NF FOR OUTPUT AS 2
8000 CLOSE 2
8010 PRINT @ 132,"File Allocated"
8020 REM Return to FILE Check
8030 RESUME 7650
8040 REM Display Error Message and END
8050 CLS
8060 BEEP
8070 PRINT
8080 PRINT "ERROR ";ERR;" ENCOUNTERED"
8090 PRINT
8100 PRINT"PROGRAM ABORTED"
8110 BEEP
8120 END
8130 REM
8140 REM -----
8150 REM + +
8160 REM + Check if TOTALED Flag (T) +
8170 REM + +
8180 REM -----
8190 REM
8200 REM Check TOTALED Flag
8210 IF T=1 THEN 8240
8220 REM Jump to Calculation Routine
8230 GOSUB 8320
8240 RETURN
8250 REM
8260 REM -----
8270 REM + +
8280 REM + Calculate Totals Routine +
8290 REM + +
8300 REM -----
8310 REM
8320 CLS
8330 PRINT @ 134,"Calculating"
8340 REM Zero Totals
8350 FOR D=0 TO 6
8360 E(D,11)=0
8370 NEXT D
8380 FOR C=0 TO 10
8390 E(7,C)=0
8400 NEXT C
8410 E(7,11)=0
8420 REM Calculate Daily Totals
8430 FOR D=0 TO 6

```

```

8440 FOR C=0 TO 10
8450 E(D,11)=E(D,11)+E(D,C)
8460 NEXT C
8470 NEXT D
8480 REM Calculate Catagory Totals
8490 FOR C=0 TO 10
8500 FOR D= 0 TO 6
8510 E(7,C)=E(7,C)+E(D,C)
8520 NEXT D
8530 NEXT C
8540 REM Calculate Total Expenses
8550 FOR D=0 TO 6
8560 E(7,11)=E(7,11)+E(D,11)
8570 NEXT D
8580 REM Set TOTALED? Flag (T)
8590 T=1
8600 RETURN
8610 REM
8620 REM -----
8630 REM + +
8640 REM + Catagory Totals Display +
8650 REM + +
8660 REM -----
8670 REM
8680 REM Inverse Text
8690 PRINT PI;
8700 PRINT @ 0," CATAGORY TOTALS "
8710 PRINT @ 265,"<ENTER>"
8720 PRINT @ 302,"to Continue";
8730 INPUT A
8740 REM Normal Text
8750 PRINT PN;
8760 RETURN

```

Listing 2:

```

1 REM EXPNSE V1.9 (packed) 16JULY83
2 REM Donald J. Hanson [71435,1465]
3 REM Copyright 1983 All Rights Reserve
d
4 MAXFILES=2:DEFINTC,D,F,L,M,D,S,T:DEFST
RA,N,P,W:P1="\ \ $$$$.*#":P2="\
\ $$$$.*#":PI=CHR$(27)+"p":PN=CHR$(27)+
"q":DIME(7,11),NC(11),ND(9):NC(0)="LODGI
NG":NC(1)="AUTO":NC(2)="AIR FARE":NC(3)=
"CAR RENTAL":NC(4)="TAXI,BUS"
5 NC(5)="PARK,TOLLS":NC(6)="BREAKFAST":N
C(7)="LUNCH":NC(8)="DINNER":NC(9)="ENTER
TAIN":NC(10)="MISC.":NC(11)="DLY TOTAL":
ND(0)="SUN":ND(1)="MON":ND(2)="TUE":ND(3
)="WED":ND(4)="THU":ND(5)="FRI":ND(6)="S
AT":ND(7)="TOT":ND(8)="DAY"
6 CLS:MS=0:PRINT@83,"1> ENTER DATA":PRIN
T@163,"2> DISPLAY TOTALS":PRINT@104,"3>
PRINT REPORT":PRINT@184,"4> END":PRINTPI
;PRINT@10," ** EXPENSE MENU ** ":PRINT@
250," Select Function ";:INPUTMS:PRINTPN
;:ONMSGOTO8,17,21,30
7 GOSUB33:GOTO6
8 GOSUB34:S=0:T=0

```


Reviews

SOFTWARE

Porta Calc Does It 'Very Well, Indeed'

The *Porta Calc* package from Skyline Marketing Corporation comes in a neat little 8" x 9" padded three ring binder, with its two cassettes in a holder on the inside of the front cover. There are three programs in the package. On the first cassette we have *Porta Calc*, in the second, *Porta Print* and *Porta Dex*.

The *Porta Calc* program is a full-blown versatile spreadsheet program that offers the complete range of functions that we have come to associate with a good spreadsheet. It is a 14 column by 26 row format with both rows and columns designed by letters (i.e. the coordinates for the home cell would be AA).

The documentation is quite good, but several mistakes were detected. On page 9 the "BG" at the end of the second paragraph should be "BF," and "AG" in the fourth paragraph should be "AF." Upon calling Skyline and questioning them regarding these errors they offered immediate and excellent support and even called back, at their own expense, with the answers to my questions in under an hour. I found them to be eager to support their product and knowledgeable enough to do so.

An easy-to-follow tutorial gets the new user off to a very rapid start and demonstrates all of the capabilities of the program in a clear and concise manner.

Full use is made of the Model 100's function keys:

F1(HOME) moves the cursor directly to the AA position on the spreadsheet.

F2(LOAD) gives the option of loading worksheets or templates from cassette or RAM.

F3(SAVE) saves files to cassette or RAM.

F4(FILE) displays files in RAM.

F5(PRINT) offers formatting for current work sheet.

F6 - not used.

F7(VIEW) turns on a view line to display formulas and other information pertinent to current operations.

F8(MENU) returns you to the M100 menu after typing "Menu" to confirm the command, this could be shortened to a Y/N response and some time would be saved.

The program will support Addition, Subtraction, Multiplication, Division, and Exponentiation. A nice feature was the ability to enter a problem on the command line and have its answer end up in a cell. For example if you put 2+4 on the command line, the answer 6 would be the value stored in the selected cell.

Cursor movement is handled in the

usual manner on the Model 100 and there is an editing feature that allows you to change a formula if you so desire.

You can save files to RAM or cassette, you can merge worksheets, you can insert and clear rows and columns, you can replicate entries, you can print out reports, you can even get back to normal, if things get messed up, without losing data.

To quote the manual, *Porta Dex*, the first of the companion programs, "allows you to reformat *Porta Calc* files into the popular DIF (Trade Mark) format used by *VisiCalc* for sharing files with other programs." The limitation exists that no formulas are transferred, only labels and values. This program is used to transfer data to another, larger-capacity computer in either modem or RS 232 interface with the M 100 via the *TELCOM* program.

Porta Print, the other companion program is a text formatter with the following features:

- 1) Left margin set
- 2) Right margin set
- 3) Top margin (first line) set
- 4) Length of page
- 5) Page numbering option
- 6) Optional continuation page header
- 7) Choice of output (screen or printer)
- 8) Line feed option
- 9) Flush right justification
- 10) Centered lines
- 11) New page control

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Correction

We are sorry for an inaccuracy in a review in the October issue of *PCM*. It was stated in that review that *SCRIBE*, of Chattanooga Systems Associates, was the first word processing program developed for the Model 100. This is not the case. In fact, Portable Computer Support Group, of Dallas, had previously issued a word processing program, *WRITE+*. A review of *WRITE+* appeared in our August issue.



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The text formatter lacks the single- or double-space option which, to me, is an absolute necessity. This, of course, could easily be added.

The one problem, on a personal and practical level, that I had with *Porta Calc* was its size. I use the Model 100 for various tasks that grease the flow of my day-to-day activities. One of the M100's capabilities that I depend on most is the address book data base file, presently only 5374 bytes long. In addition to the address file I keep other short programs loaded that perform such functions as an expense program and its files, a text formatting program, a calculator, an alarm, a calendar, a gas mileage program and a password program and I still have between 11000 and 9000 bytes free to work with. That amounts to a lot of things the Model 100 is doing. Because of the size of *Porta Calc* I had to choose which functions to eliminate. It turned out to be the address book, which caused me untold inconveniences, and the expense program. As you can see, this cuts down on the reason for having the computer in the first place. It seems that the introduction of ROM packs would help to alleviate the congestion; however, there would be a cost problem, I'm told.

All in all, I found this to be a well-designed and attractively presented package with excellent support. A package that did what it was supposed to do very well indeed.

(Skyline Marketing Corp., 4510 W. Irving Park Rd., Chicago, IL 60641, \$69.95)

—C. Davey Utter

HARDWARE

Spectrum Upgrade Just Clicks Right In Without A Hitch

Alan Funt had a movie out several years ago titled *What Can You Say To A Naked Lady?* In many ways, this review should be titled *What Can You Say About A Memory Upgrade?*

There really isn't a whole lot to say. The upgrade either works or it doesn't. It is either easy to install or it isn't. In both cases here, the answer is simple and affirmative.

The Spectrum Projects 8K memory upgrade consists of a chip and some

instructions. The instructions are complete in that they tell you exactly what to do. In fact, they are very complete, even cautioning you not to pull on wires as you open the Portable Computer's case.

Following the directions, it is easy to spot the empty place (or places) where your memory module can plug in. Being careful not to bend any of the pins on the module, you simply plug it in, put the Portable Computer back together, and then turn it on.

You will have an additional 8K of memory.

We encountered no trouble whatsoever in either the installation or the results therefrom. So, what can you say about the upgrade other than it is easy to do and works.

I purposely don't mess with the "inside" of computers, because that's not my thing. While not exactly a fumble-fingers, I am not particularly nimble, either. Yet, I had this upgrade installed in five minutes.

Two things you should know, however. Although this upgrade is less expensive than the one available from Radio Shack, opening the case will void your warranty. And, if you have programs stored in memory before you upgrade, be sure to save them on tape as you will lose all memory to the computer when you do make the change.

(Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421, \$85 each; \$80 for two or more)

SOFTWARE

Greymoon On The Rise

You have little wheat to feed a growing population. The treasury is near empty. Your advisors warn of possible revolt and imminent invasion by the Lakemen. All look to you for guidance. What's the master of *Greymoon* to do?

It this sounds familiar, you either have delusions of grandeur or you have played *Greymoon* before. If this sounds interesting, you should try out *Greymoon* on the Model 100.

Maybe you are one of those people who think the Model 100 is strictly business. Perhaps you bought a 100 because it couldn't possibly be confused with one of those "game machines." Don't worry! Tell your friends this is a thinking man's game and head for the greener pastures on the other side of the Grey-

moon Mountains.

Your mission is to build *Greymoon* into a large and powerful city. Your personal power will of course depend on the size and populations of your kingdom. You have 15 Grey-Years to win your fortune. With your band of trusty advisors (who don't always tell you much) and a few loyal subjects, you begin the annual cycle of planting, taxing, buying and selling, distributing food, and, yes, even plundering and pilaging your neighbors.

Getting started with *Greymoon* was simple enough, even without any documentation specific to the Model 100. I received a cassette with two copies of *Greymoon* on it, which was fortunate since the first wouldn't load at all. The game was apparently written for the Model I/III and converted to the 100. I haven't seen the other versions, but this BASIC program makes nice use of the 100's screen. Several of the displays in the game are loaded with information without seeming crowded. You can get a single screen summary of your entire kingdom—people, food, money, land, taxes, and even the current Grey-Year. Not bad for 320 characters!

Greymoon is a game of strategy. There are no elaborate graphics—no gobbling of dots or destruction of aliens. Yet, it does use the 100's sound capability and it is as fast paced as you choose. Though not originally written for the 100, *Greymoon* is a welcome addition to this unique machine. It's also addictive and often frustrating.

The documentation does cover the basic options of play and lays down the cardinal rule—experiment with different strategies and never assume anything. *Greymoon's* strongest point is this variety of possible strategies and the frustrating conclusion of many first tries. You quickly realize that to keep your people and attract others you must feed them well. (Do I sound somewhat benevolent? Don't worry. It's basically greed, not concern.) But the affect of adjustments to the tax is not nearly so predictable. And when you decree that it is time for the Grey-Year to end, you can never be sure what pre-ordained disasters await you.

All of this variety comes at a price. *Greymoon* requires almost 13,000 bytes to load and, if it will run at all in a 16K machine, you must completely empty it first. My guess is that you'll need 24K or more.

My only complaints about this game

The Rackseller

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are that it runs 15 Grey-Years, it includes totally unprepared-for disasters and it literally runs forever. Everytime your kingdom is in ruins, the program suggests "Maybe next reign, Master" and plunges you into your next round. The only way to end it is by using the break key. Perhaps I'm nit picking, but I *am* the Master here!

The length of each game could be much more annoying but for the way the Model 100 operates. All you have to do when you are ready to interrupt your session is turn the power off. Once you power up, you're back in mid-reign. But even in my brief attempts at kingship, I have been utterly unable to accept the devastation of all my well-laid plans. Just when I thought it was safe to go on to the next Grey-Year. . .

(Computer Shack, 1691 Eason, Pontiac, MI 48054, \$19.95)

—Dennis Kirley

New Products

Paper Tractor

Paper Tractor, a new device designed to use regular paper in your computer printer, is now available from Paper Tractor LTD.

Further information may be obtained by contacting Robert McAdoo at (805) 683-2851, or write to Paper Tractor Ltd., One South Fairview, Goleta, CA 93117.

8K RAM Module

Holmes Engineering, Inc. has just released an 8K memory module called the 1M-100. The 1M-100 plugs directly into the existing sockets in the Model 100, with no modifications to the system. Up to three of these plug-in modules may be added to upgrade the Model 100 to a total of 32K RAM memory.

Priced at \$75 for each 8K module, a \$70 per module price is given for the purchase of two or more.

For more information, please call (801) 261-5652 or write to 5175 Green Pine Drive, Murray, UT 84107.

Bar Code Reader

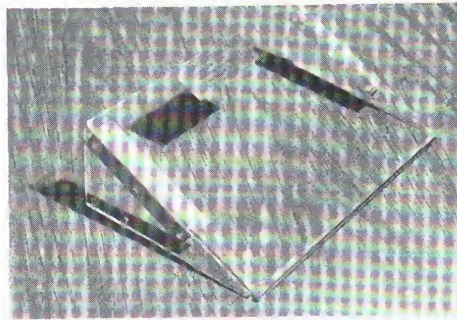
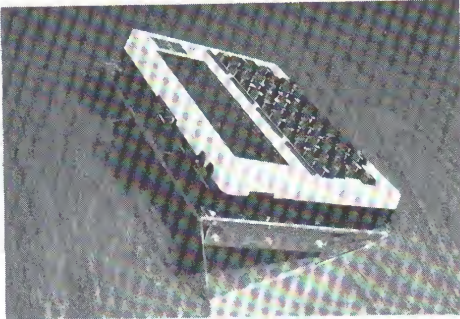
Bi-Tech Enterprises, Inc. now has Bar Code Readers for the Model 100 and the Epson HX-20 portable computers. This Bar Code Reader allows users to read industry standard "3 of 9 code" and store the results in their computer's memory. The Reader features a push-to-read switch, a scanner rate of up to 76 cm/sec, and will read lines as small as 0.3 mm.

The unit is totally self-contained and requires no additional hardware or software to operate. Each unit comes complete with software and Bar Code Reader and is available at a retail cost of \$279.95. A Bar Code generation program is also available.

Contact Thomas Vande-Stouweat (516) 567-8155 for more information.

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